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No. 86-492-CFX
Status: GRANTED

Title: Delbert Boyle, Personal Representative of the heirs
and Estate of David A Boyle, Deceased, Petitioner
v.
United Technologies Corporation

Docketed:
September 23, 1986 Court: United States Court of Appeals
for the Fourth Circuit

See also:
85-1529
86-379

Counsel for petitioner: Franecke, Louis S.

Counsel for respondent: Booker, Lewis T., Lacovara, Philip A.

Entry	Date	Note	Proceedings and Orders
1	Sep 23 1986	G	Petition for writ of certiorari filed.
2	Oct 6 1986		Brief of respondent United Technologies Corp. in opposition filed.
3	Oct 8 1986		DISTRIBUTED. October 31, 1986
5	Nov 25 1986		REDISTRIBUTED. December 12, 1986
7	Dec 22 1986		REDISTRIBUTED. January 9, 1987
8	Jan 12 1987		Petition GRANTED. Justice Powell OUT. *****
9	Feb 5 1987		Record filed.
10	Feb 5 1987		Certified copy of original record and proceedings, 9 volumes, received.
11	Feb 25 1987	G	Motion of Joan S. Tozer, et al. for leave to file a brief as amici curiae filed.
12	Feb 25 1987		Brief amicus curiae of Edwin Lees Shaw filed.
13	Feb 25 1987		Joint appendix filed.
14	Feb 25 1987		Brief of petitioner Delbert Boyle filed.
15	Feb 25 1987		Brief amicus curiae of Assn. of Trial Lawyers of America filed.
16	Mar 9 1987		Motion of Joan S. Tozer, et al. for leave to file a brief as amici curiae GRANTED. Justice Powell OUT.
18	Mar 12 1987		Order extending time to file brief of respondent on the merits until April 29, 1987.
19	Apr 17 1987		Order further extending time to file brief of respondent on the merits until May 21, 1987.
20	May 18 1987	G	Motion of Bell Helicopter Textron Inc. for leave to file a brief as amicus curiae filed.
21	May 21 1987		Brief of respondent United Technologies Corp. filed.
22	May 21 1987	G	Motion of Chamber of Commerce of the United States for leave to file a brief as amicus curiae filed.
23	May 21 1987	G	Motion of UNR Industries, Inc. for leave to file a brief as amicus curiae filed.
24	May 21 1987		Brief amicus curiae of Grumman Aerospace Corp. filed.
25	May 21 1987	G	Motion of Defense Research Institute, Inc. for leave to file a brief as amicus curiae filed.
26	May 21 1987	G	Motion of Product Liability Advisory Council, Inc., et al. for leave to file a brief as amici curiae filed.
27	May 22 1987		Lodging received.
28	Jun 1 1987		Motion of Bell Helicopter Textron Inc. for leave to file a brief as amicus curiae GRANTED. Justice Powell OUT.
29	May 21 1987		Brief amicus curiae of Natl. Security Industrial Assn., et al. filed.

Entry	Date	Note	Proceedings and Orders
30	May 21 1987		Brief amicus curiae of United States filed.
31	Jun 2 1987	D	Motion of petitioner for additional time for oral argument filed.
32	Jun 8 1987		Motion of Chamber of Commerce of the United States for leave to file a brief as amicus curiae GRANTED. Justice Powell OUT.
33	Jun 8 1987		Motion of UNR Industries, Inc. for leave to file a brief as amicus curiae GRANTED. Justice Powell OUT.
34	Jun 8 1987		Motion of Defense Research Institute, Inc. for leave to file a brief as amicus curiae GRANTED. Justice Powell OUT.
35	Jun 8 1987		Motion of Product Liability Advisory Council, Inc., et al. for leave to file a brief as amici curiae GRANTED. Justice Powell OUT.
36	Jun 5 1987	G	Motion of the Solicitor General for leave to participate in oral argument as amicus curiae and for divided argument filed.
37	Jun 15 1987		Motion of petitioner for additional time for oral argument DENIED. Justice Powell OUT.
38	Jun 15 1987		Motion of the Solicitor General for leave to participate in oral argument as amicus curiae and for divided argument GRANTED. Justice Powell OUT.
39	Jul 1 1987		CIRCULATED.
40	Jul 10 1987	G	Motion of Chamber of Commerce of the U.S. for leave to file supplemental brief filed.
41	Jul 20 1987		SET FOR ARGUMENT. Tuesday, October 13, 1987. (2nd case).
42	Aug 26 1987		Motion of Chamber of Commerce of the U.S. for leave to file supplemental brief GRANTED.
43	Sep 9 1987	X	Reply brief of petitioner Delbert Boyle filed.
44	Oct 2 1987	X	Supplemental brief of respondent United Technologies Corp. filed.
45	Oct 6 1987	D	Motion of Edwin Dees Shaw for leave to submit supplemental authority filed.
46	Oct 13 1987		Motion of Edwin Dees Shaw for leave to submit supplemental authority DENIED.
47	Oct 13 1987		ARGUED.

**PETITION
FOR WRIT OF
CERTIORARI**

86-492

Supreme Court, U.S.

FILED

SEP 23 1986

JOSEPH F. SPANIOL, JR.
CLERK

No.

**In The
Supreme Court of the United States**
October Term, 1986

DELBERT BOYLE, personal representative of the
Heirs and Estate of David A. Boyle, deceased,

Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

**PETITION FOR WRIT OF CERTIORARI TO THE
UNITED STATES COURT OF APPEALS FOR
THE FOURTH CIRCUIT AND APPENDIX**

LOUIS S. FRANECKE, Esq.

JOHN O. MACK, Esq.

MACK, HAZLEWOOD, FRANECKE & TINNEY

221 Pine Street, Suite 600

San Francisco, CA 94104

415/391-1560

MICHAEL MOORE, Esq.

CARTWRIGHT, SUCHERMAN & SLOBODIN, INC.

101 California Street, 26th Floor

San Francisco, CA 94111

415/433-0440

Counsel for Petitioner

I.

QUESTIONS PRESENTED FOR REVIEW

- I. IN LIGHT OF THE CONFLICT IN DEFINITIONS OF THE "GOVERNMENT CONTRACTOR DEFENSE" IN THE VARIOUS CIRCUITS, WHAT ARE THE FACTUAL TESTS FOR THE GOVERNMENT CONTRACTOR DEFENSE TO BE UNIFORMLY APPLIED IN ALL CIRCUITS?
- II. WAS PLAINTIFF'S CONSTITUTIONAL RIGHT TO TRIAL BY JURY DENIED WHEN THE CIRCUIT COURT FAILED TO REMAND THE CASE FOR TRIAL WHEN THE GOVERNMENT CONTRACTOR DEFENSE ADOPTED BY THE FOURTH CIRCUIT WAS AT VARIANCE TO THE INSTRUCTIONS ON THE GOVERNMENT CONTRACTOR DEFENSE GIVEN TO THE TRIAL JURY? IN OTHER WORDS, DID THE COURT OF APPEALS DECIDE THE LAW AND THE FACTS WITHOUT GIVING PLAINTIFF TRIAL BY JURY ON THE LAW AS ANNOUNCED? APPELLANT BELOW HAD NOT RAISED THE ISSUE OF IMPROPER JURY INSTRUCTIONS IN THEIR APPEAL.
- III. WAS THE JURY DECISION BELOW IMPROPERLY OVERTURNED BY THE COURT OF APPEALS BECAUSE THEY ADOPTED AN IMPROPER TEST FOR THE GOVERNMENT CONTRACTOR DEFENSE?
- IV. SHOULD MILITARY EQUIPMENT MANUFACTURERS BE SHIELDED FROM EXPOSURE TO

PRODUCT LIABILITY AND NEGLIGENT MANUFACTURE ACTIONS BY U.S. MILITARY PERSONNEL?

V. IS THE GOVERNMENT CONTRACTOR DEFENSE A JURY QUESTION OF FACT OR A QUESTION OF LAW?

VI. DOES THE PLAINTIFF OR THE DEFENDANT HAVE THE BURDEN OF PROVING THE GOVERNMENT CONTRACTOR DEFENSE?

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TO: THE HONORABLE CHIEF JUSTICE AND AS-
SOCIATE JUSTICES OF THE SUPREME
COURT OF THE UNITED STATES:

Petitioner Respectfully prays that a Writ of Certi-
orari issue to review the judgment and opinions of the
United States Court of Appeals for the Fourth Circuit
entered in this matter on or about May 27, 1986.

II

OPINIONS BELOW

On July 24, 1985, judgment was entered in the United
States District Court, Eastern District of Virginia-Rich-
mond Division, on the jury verdict, in favor of Petitioner
in amounts totally \$725,000 and is reprinted in the appen-
dix to this Petition, page A1.

On May 27, 1986, the United States Court of Appeals
for the Fourth Circuit reversed this jury verdict and re-
manded with directions to enter judgment for Defendant.
This reversal is herein sought to be reviewed. This deci-
sion is reported at 792 F.2d 413 (4th Cir. 1986) and is
reprinted in the appendix to this Petition, page A3.

This decision was announced on the same day in con-
junction with two other cases involving the same legal
questions regarding the Government Contractor Defense;
Tozer v. LTV Corp., 792 F.2d 403 (4th Cir. 1986) which
is reprinted in the appendix to this Petition, page A10;
and *Dowd v. Textron, Inc.*, 792 F.2d 409 (4th Cir. 1986).

This Court has likewise been requested to hear similar
issues in *Shaw v. Grumman Aerospace Corporation*, (1985)
778 F.2d 736.

Petitioner's timely Petition for Rehearing In Banc to the Fourth Circuit Court of Appeals was denied on June 25, 1986, as is reprinted in the appendix to this Petition, page A24.

Thereafter, the United States District Court for the Eastern District of Virginia vacated its judgment and entered judgment for Defendant on July 7, 1986, as is reprinted in the appendix to this Petition, page A25.

III

JURISDICTION

The judgment of the Court of Appeals was entered on May 27, 1986. Petitioner timely petitioned the United States Court of Appeals for the Fourth Circuit for a Rehearing In Banc which was denied on June 25, 1986.

The jurisdiction of this Court is invoked pursuant to 28 U.S.C. § 1254(1).

IV

CONSTITUTIONAL AND STATUTORY PROVISIONS INVOLVED

The Constitution of the United States, Seventh Amendment, Right To Trial By Jury:

"In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury, shall be otherwise reexamined in any Court of the United States, then according to the rules of the common law."

V

STATEMENT OF THE CASE

A.

INTRODUCTION

Petitioner's decedent, a United States Marine Helicopter Co-Pilot, was riding in a CH-53D Helicopter built by Defendant, SIKORSKY CORPORATION DIVISION OF UNITED TECHNOLOGIES CORPORATION, when the aircraft made an uncontrollable right turn at low altitude crashing approximately a mile and a half off the Virginia Beach shore, Virginia, on April 27, 1983. The pilot, crew chief and passenger escaped, but Petitioner's decedent, co-pilot, drowned in the helicopter as it sank.

Suit was brought in United States District Court for the Eastern District of Virginia at Richmond on the basis of situs of the accident being within the 3 mile limit of the Virginia coast and on diversity of citizenship grounds. It was agreed that Virginia substantive law applied.

Petitioner generally contended that decedent died because of three causes:

First, Defendant had negligently repaired a part of the control system of the helicopter which proximately caused the helicopter to go out of control and crash into the sea; and

Second, the helicopter control system was defective and did not conform to the U.S. Navy's specifications; and

Third, the co-pilot escape system was defectively designed such that the escape handle could not be reached; the escape window, which only opens out, would not open due to sea pressure forcing it in while the helicopter was sinking and it was thus not in conformity to the U.S. Navy's specifications.

Petitioner's case was presented by testimony of the surviving pilot of the helicopter, Captain Tussing of the U.S. Marine Corps (J.A. 109-227)*; the crew chief of the helicopter, Sgt. Tubbs of the U.S. Marine Corps (J.A. 228-289); the duly appointed Judge Advocate General's investigator, Major Keown, of the U.S. Marine Corps and his investigative report including many documents and statements by numerous witnesses and factual personnel. (PX1). (J.A. 293 - 296).

Also, by deposition, United States Navy's duly appointed engineering and accident investigator, Mr. Terry Fox, of the U.S. Navy at Pensacola, Florida. (J.A. 47-55, 299). Mr. Fox was acknowledged by Defendant to know more about the control system of this type of helicopter than anyone. (J.A. 455) Mr. Fox examined the wreckage and tore apart the mechanical parts to discover the cause of the crash. (J.A. 69, 826-852). His report and testimony found a metal chip in the roll servo to have been the cause. (J.A. 826-852, 45-104).

By deposition, Defendant's own employee investigator, Mr. Jessie Clemons, acknowledged that a metal chip found by Mr. Fox would cause the helicopter to roll causing the crash. (J.A. 20, 34-35).

*J.A. refers to the Joint Appendix in the appeal to the Fourth Circuit. These documents would be presented if the Court should accept this case for full briefing.

Petitioner's engineering expert witnesses, Dr. James Hayes and (J.A. 322-349) Dr. Paul Packman, (J.A. 388-429) explained and gave their opinions regarding the reasons why the metallic chip caused the helicopter to crash and why the escape system did not work.

Finally, the mother and father of Petitioner's decedent testified regarding the loss of their son and friend. (J.A. 349-367).

These witnesses were supported by a large number of documents from the U.S. Navy, the Defendant's design documents and numerous photographs of the actual crashed helicopter and similar helicopters. (J.A. 695-1412).

The overwhelming conclusion of all of this testimony was that Defendant had negligently repaired the control system causing the helicopter to crash, the co-pilot escape system did not work when it was needed, and the control system was defective.

B.

THE NEGLIGENT REPAIR BY DEFENDANT

The pilot and co-pilot of a helicopter control their flight by two control sticks, called the collective and cyclic, and foot pedals. (J.A. 1182, 117-118). The pilot and co-pilot controls are linked mechanically to one another as well as to the various control places on the helicopter. (J.A. 913, 914, 1055).

In addition, there are augmenting devices known as servos, which also control the helicopter like an auto pilot. (J.A. 886-887, 1196-1209). These servo devices afford the pilots assistance in flying, something like power

steering in an automobile. (J.A. 159, 1184-1189). However, if one of these servos goes out of control, it can make the helicopter go out of control and crash like the power steering in an automobile, turning the wheel unexpectedly, causing a crash into a tree.

The pilot of the ill-fated CH-53D helicopter, Captain Tussing, clearly testified regarding his control stick's sudden and continued movement to the right after he had initiated a right turn at about 200' of altitude. (J.A. 171-178).

Captain Tussing testified to his inability to correct the jammed stick, which was over on his right leg, despite his best efforts. (J.A. 173-178). He said he had no time (due to the low altitude) to try and start the other corrective measures to disengage his controls. (J.A. 117-178, 1194-1268). Finally, by pulling full collective, he was able to soften the impact of the aircraft into the water. (J.A. 176-177). Captain Tussing was a 1,600 hour helicopter aircraft commander and an instructor who was quite capable of flying the helicopter had there not been some malfunction with the control system. (J.A. 109-111)

Mr. Terry Fox, the appointed engineering investigator for the U.S. Navy, who had extensive experience both as a mechanic and engineer with the servo systems, found the most likely cause of the crash to be the chip found in the AFCS roll servo "Moog" valve. (J.A. 69, 850-852). The "Moog" valve is part of the servo and controls the movements of the servo. (J.A. 419).

Similarly, Dr. Paul Packman, Petitioner's engineering expert witness, Mr. Carlson, Defendant's investigator, Mr. Fox, the U.S. Navy's Investigator, and numerous De-

fendant's witnesses agreed that a metallic chip causing a jam of the "Moog" or pilot valve of the servo would cause the aircraft to experience a right jam of the control stick. (J.A. 69). In fact, the condition of the metallic chip being flattened at one end, (J.A. 70), supported Dr. Packman's explanation regarding the jamming effect of the chip in the small "Moog" valve, creating a steady control stick movement over to the right. This is entirely consistent with Captain Tussing's testimony. (J.A. 400-409).

The helicopter became inverted in the mud in 35 feet of dark and murky water with its hydraulic lines open to the sea, admitting sea water, sand and other particles. (J.A. 106-108).

Mr. Terry Fox, an independent witness, further testified that no screens or filters were found to have holes in them, which clearly established that the chip had been present in the system for some period of time. (J.A. 63, 71, 427-429).

The metal chip could have only have gotten into the servo in one of three ways. That is, due to maintenance activities by the U.S. Marines, by minor repair work done by the U.S. Navy at Pensacola, or by the complete rework and remanufacture by the Defendant. The facts established that it was the rework by the Defendant.

The screen filters, which were capable of filtering out this metallic chip, did not have a hole in them, clearly establishing that the chip was not introduced during shipboard maintenance of the servo on the subject aircraft. (J.A. 63, 427-429).

Mr. Fox testified that in his investigation, other contaminants found in the hydraulic system were consistent

with normal deterioration of the seals and aluminum housings as well as immersion in the sea water. (J.A. 66, 86, 87, 1410-1412).

Further, the likelihood of the chip being introduced at Pensacola, Florida, by the Navy was extremely unlikely due to the fact that the Navy did not disassemble the "Moog" valve from the servo (the chip being found in the "Moog" valve). This was established by Mr. Fox's testimony of seeing the yellow paint on the screws being undisturbed (paint put on by Defendant) (J.A. 83) and finding the nature and extent of the repair work done by Pensacola to be relatively minor.

Also, Mr. Bill Herald, (PX 11), had done a quality inspection audit and determined that the type of metal, steel 1010, was not used in the shop at Pensacola. (PX 11). This investigation was done at the time of the actual crash and not some two years later as was the one conducted by Defendant's witness, Mr. Ashbury. (J.A. 579-581). Defendant failed to produce the better evidence of the defendant employee who actually was stationed in Pensacola at the time of the crash. (J.A. 582).

Finally, it was established that Sikorsky had totally remanufactured the servo, including the "Moog" valve. (J.A. 497-500). None of Defendant's witnesses had actual first-hand knowledge as to what metal wire was used in their shop or at the Moog factory. (J.A. 497-498).

The jury found the Defendant had been negligent in its repair of the metal part.

C.

THE DEFECTIVE CONTROL SYSTEM AND THE DEFECT NOT COMMUNICATED TO THE U.S. NAVY

The Court of Appeals below stated, "Plaintiffs point to nothing in the record that indicates there were any hazards of which Sikorsky was aware and the Navy was not. Sikorsky's duty to warn the Navy of any hazards known to it but not to the Navy was thus not brought into question." 792 F.2d 413 at 415.

However, evidence had been presented at the trial of the elements of the design (defect) which Sikorsky was aware and that had not been presented to the Navy. They are:

1. That the amount of force required for a pilot to control the "roll" servo (override forces) under a worst malfunction of the Automatic Flight Control System (AFCS) is uncontrollable by a pilot; and
2. That there is a lack of redundancy in the system when the overriding forces are not capable of being exerted by the pilot when the pilot is close to the ground; and
3. That the safety shear pin is only connected to the number two system and not to the number one system which necessitates such high override forces. The helicopter in this case was operating on the number one system.

To briefly review, the AFCS on the subject helicopter acted like power steering. When the power steering went

awry, the pilot was forced into an uncontrolled condition where the power steering was working against his efforts to control the helicopter.

Plaintiff's Exhibit 20 (J.A. 888-895) was the detailed specifications for the AFCS prepared by Defendant Sikorsky. This was the only presentation to the Government on this subject.

Specifically at page eight, (J.A. 892) the collective and yaw aspects of the AFCS system were addressed, but the "roll" system was not addressed with regard to the worst case malfunction. Testimony at trial clearly indicated that that amount of force was approximately fifty-five (55) pounds or almost twice as much as any of the other systems. (J.A. 556-558, J.A. 407-409).

Defendant's own employee and designated expert, Mr. Knute Hanson, testified that there was no warning by Sikorsky to the United States government for the worst malfunction of the AFCS and what it was going to take to get out of the roll under this worst malfunction of the AFCS (See J.A. 556-558, J.A. 407-409). Likewise, no evidence was introduced by Sikorsky that the U.S. Navy was aware of this problem. Yet, this design limit was knowledge which ought to be known by Defendant.

Defendant's own employee, Mr. Jesse Clemons, who was one of the investigators at the actual scene of this

particular crash, testified that the force to overcome against the "hard-over" of the roll servo would be fifty-five (55) pounds. (J.A. 42).

Defendant's employee, engineer and designated expert, Mr. Roderick MacLennan, testified that the hard-over force of the roll servo would be approximately fifty-five (55) pounds to move against (See J.A. 534-536).

Nowhere did the Defendant ever warn the United States government with regard to the force and magnitude required by the pilot to override the system. Defendant presented no evidence on this critical issue.

Hence, how could the U.S. Navy accept and approve the system without this knowledge? Sikorsky offered no Navy testimony on this critical issue.

There also could be no doubt about the lack of redundancy for the number one system under the conditions of this case. The shear pin is only on the number two AFCS system. Here, the pilot was on the number one system and there was no shear mechanism available to him to override the system that had gone awry. (JA 400-404). He could not override 55 pounds of force and he had no shear pin.

This Court did not address the foregoing issues which were considered by the jury and found to be a defect.

D.

THE DEFECTIVE ESCAPE SYSTEM

The aircraft, after crashing into the water, while sinking rapidly, rolled left (toward co-pilot's side). (J.A. 185). The co-pilot's escape window only opens out, not in, and could not have been opened against the sea water. (J.A. 730, 1135-1140).

The facts establish that Lt. BOYLE had attempted to escape during the actual sinking of the aircraft. He had disconnected his seat belt and shoulder harness and had suffered lacerations on his left hand that would correspond to attempts to find the escape handle in the brown, murky water where visibility was only three feet. (J.A. 106-108), (PX-1).

When the collective handle is pulled full up, it blocks the co-pilot's access to his only escape hatch handle. (J.A. 861).

By stipulated facts, it was established that Petitioner's decedent suffered cuts on his left hand which would correspond to his attempt to reach, unsuccessfully, for the handle. (J.A. 106-108). He probably scratched it on the safety wire. The pilot's, on the other hand, is not so blocked.

Further, the testimony established that the collective handle, when pulled in its full up-right position, which Captain Tussing testified he had done just prior to impact, does in fact, block access to the control handle as shown by Petitioner's witnesses testimony and photographic exhibits. (J.A. 301, 319, 861).

When the aircraft rolled, it rolled left, or toward the co-pilot. (J.A. 185). This put the escape window under water and non-useable due to water pressure. This design

did not conform to the Navy specifications for a useable escape system under all conditions. (J.A. 700-708).

The stipulated facts also show that the water was murky with visibility of only three feet. (J.A. 106-108). The surviving crew members testified that it was by sheer luck that they were able to get themselves out in the very disorienting murky water after the helicopter had rolled over. (J.A. 187-188, 252).

Also, Captain Tussing described in detail how he had been sucked back into the aircraft as it sank. (J.A. 187). This sucking clearly accounts for how Decedent was pulled into the aft cabin in a dark, disoriented condition. Thus, despite Decedent being the best swimmer among the crew, he died. (J.A. 107).

There was no testimony by Defendant regarding any test, any reports, any specifications or any dialogue between Defendant and the U.S. Navy that the co-pilot escape window would not open while the aircraft was sinking and the window was held in place by water pressure.

There was no evidence that there had ever been any prior crash of said helicopter where this phenomenon was demonstrated to the U.S. Navy.

The alleged mock-up that the Navy was shown was not a working model which had been immersed in water. There was no testimony that the Defendant tested this system under water or demonstrated it to the U.S. Navy. Nor did the Navy have any knowledge thereof, since the Navy's training for the pilots and their escape simulator, while under water, were without windows at all. (J.A. 318-319). No Navy personnel were called to testify regarding this point or in support of Defendant's position.

Therefore, not only did the Defendant knowingly fail to inform the U.S. Navy of the overriding force on the servo, they failed to inform the Navy of the escape window being held in place by water pressure. Either one of these issues was sufficient for the jury to find for the Plaintiff.

The jury unanimously returned a verdict for the Plaintiff.

VI.

REASONS FOR GRANTING THE WRIT

A.

THERE IS A CONFLICT IN THE VARIOUS CIRCUITS REGARDING THE GOVERNMENT CONTRACTOR DEFENSE

There is conflict and confusion in the lower Courts regarding the Government Contractor Defense.

The various Circuit Courts have adopted two basic forms of the Government Contractor Defense and two hybrid versions.

The 9th Circuit announced in *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), cert. denied, 464 U.S. 1043, 104 S. Ct. 711, 79 L. Ed. 2d 175 (1984), that a supplier of military equipment is not liable for design defect where:

"1. The supplier proves that the United States established or approved, reasonably precise specifications for the allegedly defective military equipment,

2. The equipment conformed to those specifications, and,

3. The supplier warned the United States about patent errors in the government's specifications or about the dangers involved in the use of the equipment that were known to the supplier but not to the United States."

The 7th and 5th Circuits adopted the *McKay* test without modifications in *Tillett v. J.I. Case Company*, 756 F.2d 591, 596-598 (7th Cir. 1985) and *Bynum v. FMC Corporation*, 770 F.2d 556, 561-562 (5th Cir. 1985).

The other major version of the standard was announced in *In re Agent Orange Product Liability Litigation*, 534 F.Supp. at 1055 (E.D. N.Y. 1982). Those three elements are:

"1. Proof that the government established contract specifications for the product;

2. Proof that the contractor complied in all material respects with the specifications, and

3. Proof that the government knowledge of the hazards of the finished product was at least equal to that of the contractor."

The critical difference between *McKay* and *Agent Orange* is how the two tests approach the government's knowledge and conscious acceptance of a defective product. That is, *McKay* erroneously only requires the manufacturer to warn the government if the manufacturer has knowledge of the defect. This does not insure that the government, in fact, knows what it is buying.

On the other hand, the *Agent Orange* test requires the government to have knowledge of the hazard (defect)

equal to that of the contractor regardless of where the information may come from. There is no delineation between patent or latent hazard.

Clearly, knowledge on the part of the military of the defect is the thrust of the Government Contractor Defense. Therefore, the *Agent Orange* test is more in the ballpark of the policy theory behind the Government Contractor Defense.

Another difference between the *McKay* and *Agent Orange* test is the degree to which the government may be involved in setting the product specifications. *McKay* seems to acknowledge some minimal level of government involvement below which the supplier should be held responsible for design defects. Yet, further under the *McKay* test, mere governmental approval of the contractor's design will shield the supplier from liability, without showing knowledge of the defect in approval by the government. The result is absurd and not in keeping with the policy that the government actually knows what defect it is buying for its own reasons.

In *Koutsoubos v. Boeing Vertol*, 755 F.2d 352-354-355 (3rd Cir. 1985) the Court announced a hybrid version. It formally adopted the *Agent Orange* test, above, 755 F.2d at 355, but added further to the first part of the *McKay* "approval" reasoning. That is, as *Koutsoubos* said, "government approval of specifications developed through a continuous series of negotiations between the contractor and the military would satisfy the first prong of the "Agent Orange" defense, even though the majority of the

specifications originated with the contractor." The Court unfortunately does not specify that the back and forth actually addressed the specific defect.

The second hybrid was announced in *Shaw v. Grumman Aerospace Corporation*, 778 F.2d 736 at 745 (11th Cir. 1985) where that Court was not satisfied with either of the two standards. That Court's central concern was whether or not the military actually made a decision to use a product that it knew to be dangerous to servicemen. Thus, they fashioned a test that a contractor may escape liability only if it affirmatively proves:

1. "That it did not participate, or participated only minimally, in the design of those products or parts of the products known to be defective; or
2. That it timely warned the military of the risk of the design and notified it of alternative designs reasonably known by the contractor, and that the military, although forewarned, clearly authorized the contractor to proceed with the dangerous design." 778 F.2d 736 at 745.

The Court felt that the first element of the test was fashioned to allow a military contractor to show when it actually worked jointly with military personnel in producing detailed specifications or that it was so minimal to excuse it from proving the second part of the test. 778 F.2d 736 at 746.

The *Shaw* Court went on to say that the second test to be proven by the defendant by a preponderance of the evidence was that the contractor both warned the military of the risk of the product or product part that it designed and informed it of a design alternative reasonably known to the contractor. However, reasonable knowledge is not

synonymous with omniscience. A risk is reasonably known when it is either actually known, or reasonably ought to be known, given good design practices in the industry. 778 F.2d 736 at 746.

The Fourth Circuit, at variance to all other circuits, in *Tozer v. LTV Corp.*, 792 F.2d 403, 408, adopted the *McKay* test, but applied *Koutsoubos* reasoning. The *Tozer* law was then applied in this case.

Thus, clearly there is a conflict in the various circuits pertaining to the Government Contractor Defense.

These conflicts in the various circuits are of no small import when considered in light of the different burdens of proof required of the Defendant and also of the Plaintiff in meeting the various tests.

For example, in some circuits the burden of proof is to show that the government knew the hazards associated with the specific design which later proved to be defective and causing injury. On the other hand, the other circuits only require that the manufacturer warn the government of defects it knows about or ought to know about. In other words, the government may have no knowledge of the defect and may have not made any conscious decision to purchase a defective product. This is very expensive and dangerous.

Clearly, this is only one example of the chaos created by the various conflicting interpretations in the Circuits. These matters will be briefed in more depth should this Court accept this Writ of Certiorari.

THE COURT OF APPEALS DEPARTED FROM ACCEPTABLE AND USUAL COURSE OF JUDICIAL PROCEEDINGS BECAUSE THE TRIAL COURT GAVE THE "AGENT ORANGE" TEST INSTRUCTIONS AND THE COURT OF APPEALS ADOPTED THE "McKAY" TEST AND DID NOT REMAND FOR JURY TRIAL ON THE LAW AS ANNOUNCED

The jury below was instructed regarding the Government Contractor Defenses as follows:

"In addition, Plaintiff cannot recover either under a theory of negligence or breach of implied warranty based on a design defect if Defendant UNITED TECHNOLOGIES CORPORATION proves, by preponderance of the evidence:

1. That the United States Navy established or approved the specifications for the co-pilot egress system,
2. That the helicopter conformed to these specifications, and
3. That the United States Navy knew as much or more than the defendant about the helicopter's hazards and, therefore, Defendant did not need to warn the government of the dangers involved in the use of the equipment.

It is not necessary for Defendant UNITED TECHNOLOGIES CORPORATION to prove that the government established every exact detail of the egress system. However, Defendant must prove by a preponderance of the evidence that the United States Navy specifications were more than just general requirements, or that the Navy examined or agreed to a detailed description of the system." (JA 662.)

However, the Court of Appeals announced in the *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986) case, decided on the same day as the case herein, that the 4th Circuit adopted the following Government Contractor Defense:

“A military contractor can escape liability for a design defect if it can demonstrate that:

1. The United States is immune from liability;
2. The United States approved reasonably precise specifications for the equipment;
3. The equipment conformed to these specifications; and,
4. The supplier warned the United States about dangers in the use of the equipment that were known to the supplier but not to the United States.”

Here, the United States District Court, in essence, gave the *Agent Orange* test to the jury and the jury found the defendant did not meet its burden of proof and that the defendant was liable. However, the United States Court of Appeals then applied, in essence, the *McKay* test and took the place of the jury to find that the defendant was not liable.

The Court of Appeals decided the case based on a mix of the other Circuits' reasoning (per *Koutsoubos*) for its own interpretation of the facts and law without the jury having an opportunity to consider it (see appendix to this Petition, page A3).

Importantly, Appellant below did not argue that the trial Court had improperly instructed the jury regarding the Government Contractor Defense. To the contrary, Defendant Appellant below merely argued that it had presented sufficient evidence to support that defense according to the jury instructions on the law. The jury, who heard the case, thought otherwise.

Consequently, Petitioner herein has never been afforded the opportunity of briefing and arguing the case (with citations to appropriate evidence, etc.) regarding the facts on the Government Contractor Defense as announced by the Fourth Circuit herein. This amounts to a trial without due process and without right to trial by jury.

Petitioner had no reason to believe that the Fourth Circuit Court of Appeals would not agree that the trial Court's instructions were appropriate since that issue was not raised on appeal. Petitioner did not brief or argue any of those issues at trial or on argument to the Court of Appeals.

Thus, despite the conflict in the various circuits, it is clear that the Petitioner has not received a trial by jury based upon the law first announced by the 4th Circuit Court of Appeals in variance to the law as given to the jury in the District Court. This is clearly a violation of the 7th Amendment to the United States Constitution, Right to Trial by Jury.

The Court of Appeals below should have remanded the case for a new trial based on a change of the law of the Government Contractor Defense from the law on which the jury was instructed.

In determining whether or not evidence was sufficient to uphold the verdict, the Court of Appeals “must view the evidence in a light most favorable to the jury's verdict and give the prevailing party the benefit of all reasonable inferences which can be drawn from the evidence. *Klein v. Sears Roebuck Company*, 773 F.2d 1421, 1424 (4th Cir. 1985) citing *Krotkoff v. Goucher College*, 585 F.2d 675, 677 (4th Cir. 1978).

Yet, the Court of Appeals, strained to reverse the case by ignoring the wealth of evidence favorable to Petitioner's jury verdict. (See previous sections herein).

In light of the abundance of evidence presented by Petitioner, it takes little inference to determine that the jury placed more credence in the Petitioner's evidence than that of the Defendant. This was the case on both the defect in the manufacturer's product and also in the negligent maintenance performed by the Defendant on the subject aircraft. Yet, the Fourth Circuit, reversing the two other similar cases, decided on the same day (*Tozer* and *Dowd*, *supra*,) were caught up in a momentum which ignored Petitioner's basic rights.

As previously stated, the District Court instructed generally according to the *Agent Orange* definition of the Government Contractor Defense. However, the Court of Appeals then announced the criteria to be that of *McKay* and *Koutsoubos*. In other words, the jury never had an opportunity to consider the facts and the law as presented in the case. The Court of Appeals announced its own law and made its own fact decision. This is clearly a violation of the Seventh Amendment, Right to Trial by Jury. At very least, the case should be remanded for trial based upon the announcement of the provisions of the Government Contractor Defense by the Circuit Court.

On the other hand, if this Court decides the provisions of the Government Contractor Defense are in accord with the District Court's jury instructions below, the District Court and jury findings should be affirmed and the Court of Appeals' decision reversed. This is so since the jury had an opportunity to consider the defense in light of that applicable law and found that the Defendant's burden had not been met.

C.

IF THE GOVERNMENT CONTRACTOR DEFENSE IS A JURY QUESTION, THE COURT OF APPEALS IMPROPERLY DECIDED THE CASE ON LAW IT JUST ANNOUNCED WITHOUT REMANDING FOR A TRIAL BY JURY ON THE FACTS REGARDING THE JUST ANNOUNCED LAW

All the various circuits which have adopted the Government Contractor Defense have agreed that the defense is a jury question and that the burden of proof is on the Defendant. *Koutsoubos v. Boeing Co.*, 755 F.2d 352 (3rd Cir. 1985), *In re Air Crash Disaster at Manheim, Germany*, 769 F.2d 115 (3rd Cir. 1985), *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983); *Tillett v. J I Case Company*, 756 F.2d 591 (7th Cir. 1985), *Schoenborn v. Boeing Company*, 586 F.Supp. 711 (E.D. Pa. 1984), *Shaw v. Grumman*, 778 F.2d 736 (11th Cir. 1985).

If this is so and if the Fourth Circuit announced the law pertaining to the Government Contractor Defense as being what this Supreme Court wishes to have as its statement in the matter, then the Fourth Circuit should have remanded the case for trial on the facts before the jury.

The Seventh Amendment, Right to Trial by Jury, expressed the Federal policy favoring jury decisions of disputed fact questions. *Atlantic and Gulf Stevedores, Inc. v. Ellerman Lines, Ltd.*, (PA 1962) 82 S. Ct. 780, 369 U.S. 355. When there is a debatable issue of fact in the trial of a suit at common law in a Court of the United States, the right to have it determined by jury is guaranteed by the Seventh Amendment. *Hunt v. Bradshaw*,

(Court of Appeals N.C. 1957) 251 F.2d 103. See also *Helene Curtis Industries, Inc. v. Pruitt*, (Court of Appeals TX 1967) 385 F.2d 841, Cert. denied 88 S. Ct. 1806, 391 U.S. 913.

Appellant below did not argue that the trial Court had improperly instructed the jury regarding the Government Contractor Defense. Defendant Appellant below merely argued that it had presented sufficient evidence to support the defense according to the jury instructions on the law. Of course, the jury, who heard the case, thought otherwise.

The Fourth Circuit Court of Appeals took it upon themselves to not only change the law, but then to determine the factual issues without the benefit of a jury.

This amounts to a trial without due process and right to trial by jury. Petitioner Appellee had no reason to believe that the Court of Appeals would not agree that the trial Court's instructions were appropriate since that issue was not raised on appeal.

The Fourth Circuit has not followed the mandate previously stated that the jury finds the factual issues.

Petitioner respectfully contends that the Fourth Circuit Court of Appeals has so far departed from the accepted and usual course of judicial proceedings as to call for an exercise of this Supreme Court's power of supervision herein.

D.

DID THE COURT OF APPEALS ADOPT AN IMPROPER AND NON-FUNCTIONAL SET OF TESTS FOR THE GOVERNMENT CONTRACTOR DEFENSE AND THUS IMPROPERLY REVERSE THE JURY VERDICT BELOW.

The Fourth Circuit Court of Appeals has adopted the *McKay* criteria regarding the Government Contractor Defense and applied some of the *Koutsoubos* reasoning.

However, as enumerated in *Shaw v. Grumman Aerospace*, (11th Cir. 1985) 778 F.2d 736 at 744-746, that Court properly was concerned whether or not the military actually made a decision to use a product that it knew to be dangerous to servicemen. Did the government really know what it was buying?

In other words, whose responsibility is it to accept the product? When, following the *McKay* test, the manufacturer does not warn the government of a particular defect because it did not know about it or did not spend enough time to find out about it, then the government obviously does not know what it is buying. Or, should the government be shown to have been aware of the defect and accepted it anyway regardless from what source the information came. (*Agent Orange* test) Clearly, the latter is the better test.

As shown in *Shaw*, specifications may be minimal or detailed, quantitative or qualitative, general or specific; they may range from meticulous descriptions of each bearing and bushing required, to vague hopes for "simple" or "fail-safe" products. The central question is, did the military truly know what it was buying with regard to the particular defect?

In that light, it is submitted that the *McKay* test does not insure such knowledge. For the *McKay* test, the manufacturer may hide behind ignorance or non-testing of a particular product and merely get out by saying, "We didn't know about it". This would cost the government money as well as creating hazards for the military personnel who are expensive to train and maintain let alone the loss of equipment and lives.

Further, the *McKay* test, puts the burden of proof on the Plaintiff to prove that the Defendant knew or should have known of the particular defect. Instead of requiring the Defendant to go forward with his evidence to meet the burden of proof, all the Defendant has to do is deny knowledge and the burden shifts to the Plaintiff. It is no burden on the Defendant at all to prove an act of omission rather than an act of commission which is the criteria under the *Agent Orange* test.

The *Koutsoubos* reasoning is also flawed in that the reasoning allows for a back and forth between the military and the manufacturer resulting in the final design. However, such back and forth does not necessarily mean that the particular defect was addressed. It is a question of *what* was being considered in the back and forth, not the quantity. For example, a hundred telephone calls from the military to the manufacturer regarding the cockpit of an airplane, does not establish conversation regarding the wing of the airplane.

The permutations and combinations of the Government Contractor Defense are both lengthy and intricate. Its ramifications will be felt throughout the entire United States Government military industrial complex and potentially involves trillions of dollars.

Petitioner therefore requests that this Supreme Court review the Federal Court of Appeals' decision which decided this important question of Federal law and settle the conflict between the Circuits.

E.

DOES A SOUND POLICY EXIST FOR THE ALLOWANCE OF THE GOVERNMENT CONTRACTOR DEFENSE SHIELDING THE MILITARY EQUIPMENT MANUFACTURER FROM PRODUCT LIABILITY OR NEGLIGENT DESIGN?

The military industrial complex constitutes a permanent part of the American way of life. Its symbiotic, even nepotistic, relationship provides a strong industrial base involving billions of tax-payer dollars.

It is precisely these billions of dollars of equipment which are at risk to the government when the government (through the Courts) ironically insulates the manufacturer from being held accountable for defects and negligence. This amounts to vicarious sovereign immunity.

Yet, the members of the Armed Forces using the products constitute a distinct and insular minority dwindling in numbers. Can providing compensation to those few members of the Armed Forces injured by negligent or defectively designed military products really be viewed as a threat to this well entrenched, and well funded giant? Today, the solitary inventor, tinkering in his shop, has been overshadowed by task forces of scientists and laboratories and testing fields.

Without considering any empirical data, the 9th Circuit stated that the demand for military equipment is not elastic (*McKay v. Rockwell International Corp.*, 704 F.2d 444, 451 (9th Cir. 1983) Cert. denied 464 U.S. 1043, 79 L. Ed. 2d 175 (1984)). They take the unsupported position that there would be increased costs to manufacturers due to liability for defective products and that inelastic prices would result in increased costs to the manufacturers' decreasing profits and, hence, fear of manufacturers' willingness to supply government needs.

However, military products clearly enter into the civilian market and foreign governments. Every manufacturer maintains policies of liability insurance to cover suits brought by civilians and other agencies with regard to their products.

Use of military aircraft by civilians occurs with great frequency. In *Schneider v. Lockheed Aircraft Corp.*, 658 F.2d 835, 838 (D.C. Cir. 1981) Cert. denied, 455 U.S. 994 (1982), a military C5A transport plane evacuated Vietnamese orphans from South Viet Nam on behalf of a private organization. In *Ashland v. Link Ling-Tempero-Vaught, Inc.*, 711 F.2d 1431 (9th Cir. 1983), a military C135 aircraft carried civilian scientists, technicians, civilian and Air Force employees, as well as, Air Force personnel. In *Schoenborn v. Boeing Company*, Case No. 82-4339 (E.D. Penn. 1983), a military helicopter carried civilian parachutists during an air show. Thus, military manufacturers have clearly foreseen use of their products by civilians who are not insulated by the Government Contractor Defense.

These military aircraft manufacturers are already liable for and insured against injuries to civilians caused by the defective design of their products.

Liability imposed on the manufacturer promotes recalls, refittings and new warnings by manufacturers of the defective products. The manufacturer would thus have the incentive to remedy the defect in other identical and similar products by altering the product's physical characteristics or warnings. In *Brown v. Caterpillar Tractor Company*, 696 F.2d 246, 253 (3rd Cir. 1982), the Court implied that, generally, government specifications cannot be interpreted to require manufacture of a defective product.

In addition, liability promotes safer designs by decreasing the net profit in unsafe products. The analysis of safety incentives in *McKay* (*supra*, 451-2) is fundamentally flawed because it focuses solely on demand and implicitly assumes a market with one purchaser and one supplier. The United States government is not always the sole purchaser.

Liability deters unsafe designs by educating the industry. Litigation may require manufacturers to make public information which may improve the safety of an entire industry. In *Agent Orange*, several manufacturers were unaware of the health hazards associated with dioxin contamination (565 F.Supp. 1272-3). One manufacturer developed a test for dioxin contamination (*id.* 1269-70). Another manufacturer eliminated dioxin from its product (*id.* 1274). Thus, elimination of this health hazard was and is technically and economically feasible. Yet, absent this litigation, these military manufacturers did not share this information, or, with one exception, eliminate this defect. Clearly, the added incentive of products liability is needed. (Accord, *Foster v. Day and Zimmerman, Inc.*, 502 F.2d 867, 871 (8th Cir. 1974)).

Many other analyses regarding this nationally important issue will be presented should this Court agree to hear this important issue.

VII.

PRAYER FOR RELIEF

Petitioner respectfully requests to be heard before this honorable Court.

Respectfully Submitted,

/s/ LOUIS S. FRANECKE, ESQ.
MACK, HAZLEWOOD, FRANECKE & TINNEY

VIII.

**APPENDIX TO PETITION FOR WRIT
OF CERTIORARI**

A1

JUDGMENT IN A CIVIL CASE

(Filed July 24, 1985)

UNITED STATES DISTRICT COURT

District—

Eastern District of Virginia—Richmond Division

Docket Number—

Civil Action No. 84-0486-R

Name of Judge or Magistrate—

Richard L. Williams, U.S. District Judge

Case Title—

DELBERT BOYLE, etc.,

Plaintiff,

v.

UNITED TECHNOLOGIES CORPORATION

Defendant.

[X] Jury Verdict. This action came before the Court and a jury with the judicial officer named above presiding. The issues have been tried and the jury has rendered its verdict.

[] Decision by Court. This action came to trial or hearing before the Court with the judge (magistrate) named above presiding. The issues have been tried or heard and a decision has been rendered.

IT IS ORDERED AND ADJUDGED that the plaintiff, DELBERT BOYLE, personal representative of the Heirs and Estate of David A. Boyle, deceased, recover

of the defendant, UNITED TECHNOLOGIES CORPORATION, the sum of SEVEN HUNDRED TWENTY-FIVE THOUSAND AND NO/100 DOLLARS (\$725,000.00) with legal interest thereon at the rate of 7.60% per annum, until paid, and his costs of action. It is further ORDERED and ADJUDGED that the plaintiff, DELBERT BOYLE, personal representative of the Heirs and Estate of David A. Boyle, deceased, shall distribute this amount as follows:

DELBERT BOYLE, father of David A. Boyle:
\$250,000.00;

WILMA BOYLE, mother of David A. Boyle:
\$250,000.00;

KAREN LYNN BOYLE,
sister of David A. Boyle: \$ 75,000.00;

JANICE BOYLE FREITAG,
sister of David A. Boyle: \$ 75,000.00;

and

TERRY LYNN BOYLE,
sister of David A. Boyle: \$ 75,000.00.

A TRUE COPY TESTE:

W. FARLEY POWERS, JR. Clerk

By: /s/ John W. Hawkins,
Deputy Clerk

Clerk—

W. FARLEY POWERS, JR., Clerk
(By) Deputy Clerk

/s/ John W. Hawkins,
Deputy Clerk

Date: July 24, 1985

UNITED STATES COURT OF APPEALS
FOR THE FOURTH DISTRICT

No. 85-2264

Delbert Boyle, personal representative of the
Heirs and Estate of David A. Boyle, deceased,
Appellee,

versus

United Technologies Corporation,
Appellant,
and

Sikorsky Aircraft,
Defendant.

Appeal from the United States District Court for the
Eastern District of Virginia, at Richmond. Richard L.
Williams, District Judge. (C/A 84-486).

Argued: March 6, 1986 Decided: May 27, 1986

Before RUSSELL, HALL and WILKINSON,
Circuit Judges.

Lewis T. Booker (Lonnie D. Nunley, III; Hunton
& Williams on brief) for Appellant; Louis S. Franecke
(Mack, Hazlewood, Franecke & Tinney; James E. Moore;
Staples, Greenberg, Minardi & Kessler on brief for
Appellee).

PER CURIAM:

David Boyle drowned after the Marine helicopter he was flying crashed in the Atlantic Ocean. Boyle's father, Delbert Boyle, on behalf of himself, Boyle's mother and three sisters sued the Sikorsky Division of United Technologies Corporation, hereinafter "Sikorsky"), the manufacturer of the helicopter. Boyle alleged negligence and breach of warranty in the design of the co-pilot's escape hatch and the rework of the helicopter's control system.

The jury found for plaintiffs. Sikorsky moved for a judgment notwithstanding the verdict, arguing that the military contractor defense shielded it from liability for the alleged design defect, and that plaintiffs had failed to establish Sikorsky's responsibility for the malfunction of the control system. The district judge denied Sikorsky's motion.

We reverse and remand with directions to enter judgment for defendant.

I.

On April 27, 1983, a Marine helicopter manufactured by Sikorsky (a CH-53) crashed in the ocean off the coast of Virginia Beach. The four crew members survived the impact. Three of them escaped through emergency exits, but the co-pilot, David Boyle, did not escape, and drowned.

At trial, plaintiffs attempted to show that Sikorsky had defectively repaired the pilot valve of the helicopter's servo. The servo acts at a sort of power steering to assist the pilot in flying the plane. After the accident, a small chip of wire was found in the pilot valve. Plaintiffs argued that the chip caused the servo to stop functioning, the pilot

lost control of the helicopter, and the helicopter crashed into the water.

The metal chip could have been introduced at one of three times: when Sikorsky overhauled the helicopter in late 1981-early 1982; when the Navy reworked it in late 1982; or during maintenance of the hydraulic system by the marines. The parties agree that it is least likely that the servo was contaminated during maintenance. Plaintiffs contended at trial that the chip was most likely introduced by Sikorsky.

Plaintiffs also contended that Sikorsky had defectively designed the co-pilot's escape hatch. Specifically, plaintiffs alleged that when the collective, one of the control sticks, was pulled full up, it interfered with the co-pilot's access to his escape hatch.

The jury, in a general verdict, found for plaintiffs and awarded them \$725,000. Because we believe the military contractor defense precludes any recovery for the design defect, and because there was insufficient evidence to conclude that Sikorsky was the party that introduced the chip, we reverse the decision below.

II.

A military contractor can escape liability for a design defect if it can demonstrate that 1) the United States is immune from liability; 2) the United States approved reasonably precise specifications for the equipment; 3) the equipment conformed to those specifications; and 4) the supplier warned the United States about dangers in the use of the equipment that were known to the supplier

but not to the United States. *Tozer v. LTV Corp.*, No. 84-1907, slip op. (4th Cir. 1986).*

Sikorsky and the Navy worked together to prepare detailed specifications for the CH-53 helicopter. One of Sikorsky's program engineering managers for the CH-53 described in some detail the back-and-forth discussions between Sikorsky and the Navy. We have previously said that this type of exchange of information will normally suffice to establish government approval of the design in question. *See Tozer*, slip op at 13. In addition, Sikorsky built a mock-up of the cockpit with all the instruments and controls, including the collective stick and the emergency escape hatch. The Navy reviewed the mock-up and approved the design. As a result, Sikorsky has adequately demonstrated that the Navy approved reasonably detailed specifications for the escape hatch.

Sikorsky then built the helicopter, and in 1970 the Navy accepted it as fully complying with specifications. The Navy thus had thirteen years of experience with this particular helicopter at the time of Boyle's crash. Plaintiffs point to nothing in the record that indicates there were any hazards of which Sikorsky was aware and the Navy was not. Sikorsky's duty to warn the Navy of any hazards known to it but not to the Navy was thus not brought into question.

Because Sikorsky has satisfied the requirements of the military contractor defense, it can incur no liability for

**Tozer* and its companion cases have all involved isolated incidents in the course of training exercises. We obviously have no occasion to address the governing considerations at a time of national emergency.

negligence or breach of warranty for the allegedly defective design of the escape hatch.

III.

We need not consider in this case the applicability of the military contractor defense to questions of manufacture and overhaul, because Sikorsky's liability can in no event be established. Even if the metal chip were the cause of Boyle's accident, plaintiffs must still show that defendant's defective rework introduced the chip, for the law of products liability in Virginia does not permit recovery where responsibility is conjectural. *Logan v. Montgomery Ward & Co., Inc.*, 219 S.E.2d 685 (Va. 1975).

Plaintiffs have failed to do more than speculate that Sikorsky introduced the metal chip into the pilot valve of the servo. It is true that when Sikorsky reworked the helicopter in late 1981-early 1982, it disassembled the servo. After the rework was complete, Sikorsky put a tamper seal of yellow paint on the valve. The yellow paint was undisturbed, suggesting that no one had removed the valve since the Sikorsky rework. However, when the Navy repaired the servo in late 1982, it removed the power piston, exposing the hydraulic system to contaminants, and creating the substantial possibility that when the piston was returned to the servo, the chip got into the valve from the unsealed underside.

The chip was made of carbon steel. The manager of product safety at Sikorsky testified that Sikorsky used only stainless steel, in order to prevent corrosion, and that it had no carbon steel in its inventory. Plaintiffs argued that the size of carbon wire that formed the chip was so

common that it would not have been listed in Sikorsky's inventory. Plaintiffs also introduced a Navy audit which said that wire of the type and size of the chip found in the servo was not used in the rework shop at the Pensacola Naval Air Rework facility. In response a Sikorsky representative at Pensacola testified that the Navy did have carbon steel in its inventory from at least July of 1982.

It remained plaintiffs' burden to prove that Sikorsky was responsible for the introduction of the chip into the pilot valve of the servo. Virginia products liability law is assiduous in conditioning liability upon responsibility. "Under either the warranty theory or the negligence theory the plaintiff must show . . . that the unreasonably dangerous condition existed when the goods left the defendant's hands." *Logan v. Montgomery Ward*, 219 S.E.2d at 687 (Va. 1975). It is well established that if there is more than one possible cause of an injury, the plaintiff must show that the defendant caused the injury:

When there is substantial evidence introduced which tends to prove that plaintiff's injuries may have resulted from one of two causes, for one of which the defendant is responsible and for the other of which he is not responsible, such defendant is entitled to have the jury told that the plaintiff must fail if his evidence does not prove that his damages were produced by the negligence of defendant; and he must also fail if it appears from the evidence just as probable that damages were caused by one as by the other action because the plaintiff must make out his case by a preponderance of the evidence.

Cape Charles Flying Service, Inc. v. Nottingham, 47 S.E.2d 540, 544 (Va. 1948). See also, *Spurlin v. Richardson*, 128 S.E.2d 273, 277 (Va. 1962); *Sneed v. Sneed*, 244 S.E.2d 754, 755 (Va. 1978).

"The evidence in the instant case fails to eliminate the possibility that the blame attaches to some party other than" Sikorsky. See *Logan v. Montgomery Ward*, 219 S.E.2d at 688. Both Sikorsky and the Navy reworked the servo to an extent that would have permitted the chip to enter the pilot valve. Sikorsky and Boyle presented conflicting evidence on the presence of carbon steel in the rework shops at Sikorsky and Pensacola. "The evidence must prove more than a probability of negligence. A plaintiff must show why and how the incident happened. And if the cause of the event is left to conjecture, guess, or random judgment, the plaintiff cannot recover." *Town of West Point v. Evans*, 299 S.E.2d 349, 351 (Va. 1983). Defective rework by Sikorsky is by no means "the only reasonable inference that can be drawn to explain" the presence of the chip. *Logan v. Montgomery Ward*, 219 S.E.2d at 688. In *Logan*, the Virginia supreme Court declined to permit a jury to speculate whether defective manufacture or defective installation caused a gas range to explode. Here also, a defendant whose responsibility is not affixed with reasonable certainty is entitled to judgment as a matter of Virginia law.

REVERSED

UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT

No. 84-1907(L)

Joan S. Tozer, surviving widow of Eliot F. Tozer, deceased and to her own use and benefit and to the use and benefit as mother and next friend of:

Katherine S. Tozer, surviving minor child of Eliot F. Tozer, deceased and; Lindsay M. Tozer, surviving minor child of Eliot F. Tozer, deceased and; Joan S. Tozer, personal representative of the estate of Eliot F. Tozer, deceased,

Appellees,

versus

LTV Corporation, a Texas Corporation; Jones & Laughlin Industries, Inc.; Vought Corporation, a Delaware Corporation,

Appellants.

Bell Helicopter Textron, Lockheed Corp., McDonnell-Douglas Corp., United Technologies Corp.,

Amici Curiae.

No. 84-1962

Joan S. Tozer, surviving widow of Eliot F. Tozer, deceased and to her own use and benefit and to the use and benefit as mother and next friend of:

Katherine S. Tozer, surviving minor child of Eliot F. Tozer, deceased and; Lindsay M. Tozer, surviving minor child of Eliot F. Tozer, deceased and; Joan S. Tozer, personal representative of the estate of Eliot F. Tozer, deceased,

Appellants,

versus

LTV Corporation, a Texas Corporation; Jones & Laughlin Industries, Inc.; Vought Corporation, a Delaware Corporation,

Appellees.

Bell Helicopter Textron, Lockheed Corp., McDonald Douglas Corp., United Technologies Corp.,

Amici Curiae.

Appeal from the United States District Court for the District of Maryland, at Baltimore. Herbert F. Murray, District Judge. (C/A 81-2134).

Argued: December 5, 1985 Decided: May 27, 1986

Before RUSSELL, HALL and WILKINSON, Circuit Judges.

Drew Pomerance (Kern and Wooley; Charles E. Iliff, Jr.; Semmes, Bowen & Semmes on brief) for Appellants; Michael J. Pangia (Smiley, Olson, Gilman & Pangia; Paul D. Bekman on brief) for Appellees; (Lewis T. Booker; L. Neal Ellis, Jr.; Hunton & Williams on brief) for Amici Curiae.

WILKINSON, Circuit Judge:

In 1980, Lieutenant Commander Eliot Tozer was killed when the Navy plane he was piloting crashed. His widow, Joan Tozer, and his two minor children brought an action against LTV Corporation and its subsidiary Vought Corporation under the Death on the High Seas Act (DOHSA) 46 U.S.C. § 761 *et seq.* and general maritime law, alleging the defective design of a modification to the airplane. The jury returned a verdict in favor of the plaintiffs. Because the government contractor defense shields the contractor from liability for design defects under either a strict liability or a negligence theory when the government has approved reasonably detailed specifications, we reverse and remand for entry of judgment in favor of the defendants.

I.

Tozer's crash occurred off the coast of California while his plane was executing a low-altitude, high speed

fly-by of its carrier, the U.S.S. Kitty Hawk. At trial, Joan Tozer contended that the plane had crashed because a panel known as the "Buick Hood" had come off in mid-flight, causing him to lose control of his Navy RF-8G Reconnaissance plane. The Buick Hood is a hinged panel that permits access to the equipment underneath so that it can be repaired and maintained; the panel should not open during flight.

When the RF-8G was first designed, it had a one-piece panel that wrapped around the top of the aircraft. In order to do maintenance or repair work in the compartment below, the whole panel had to be removed. The Navy asked Vought to modify the panel so that the systems beneath it could be more easily and quickly maintained. Vought cut the panel into three pieces, fixing the center piece to the aircraft, and hinging the two outer pieces along the center line. The non-hinged sides of the hood are fastened with "camlocs," quick fasteners which can be released by a turn of a screwdriver. Tozer contends that it is well known that camlocs often come loose, because of wear, vibration, or corrosion, and that usually many camlocs are installed for safety. Tozer said that Vought was negligent because it did not fasten the panel with redundant camlocs.

Vought contended the design had been carefully analyzed, tested, and found adequate. More fundamentally, Vought argued that it could not be found liable for the design of the aircraft since the Navy had approved it, and the company shared the United States' immunity through the government contractor defense. The district judge instructed the jury that the government contractor defense precluded recovery on the basis of strict liability, but did

not instruct the jury on the defense with respect to negligence. The jury returned a special verdict, finding that defendants were negligent in the design of the Buick Hood modification and that the U.S. Navy had reviewed and approved reasonably detailed specifications for the Buick Hood modification. The jury awarded \$350,000 to Joan Tozer, and \$50,000 to each of her two daughters.

Vought contends that the district judge should have instructed the jury that the government contractor defense precludes recovery for negligence as well as strict liability. We agree that the defense applies here to prevent recovery under either theory and reverse and remand for entry of judgment notwithstanding the verdict in favor of Vought.¹

II.

Traditionally, the government contractor defense shielded a contractor from liability when acting under the direction and authority of the United States. *Yearsley v. W. A. Ross Constr. Co.*, 309 U.S. 18, 20 (1940). In its original form, the defense covered only construction projects, *McKay v. Rockwell Int'l Corp.*, 704 F.2d 444, (9th Cir. 1983), *cert. denied*, 464 U.S. 1043, 104 S.Ct. 711 (1984). Its application to military contractors, however, serves more than the historic purpose of not imposing liability on a contractor who has followed specifications required or approved by the United States government. It ad-

¹We do not accept Tozer's argument that defendants waived the government contract defense by not setting it out in their answer. As the district court noted, the delay "was primarily due to the fact that the *McKay* case, which was the sole authority cited in their motion, had only recently been decided."

vances the separation of powers and safeguards the process of military procurement. We consider each of these values in turn.

The judicial branch is by design the least involved in military matters. "The complex, subtle, and professional decisions as to the composition, training, equipping, and control of a military force are essentially professional military judgments, subject *always* to civilian control of the Legislative and Executive Branches." *Gilligan v. Morgan*, 413 U.S. 1, 10 (1973) (emphasis in original). Judges possess no power "To declare War . . . To raise and support Armies . . . To provide and maintain a Navy." U.S. Const. art. 1, sec. 8, cl. 11-13. Nor have they been "given the task of running the Army," *Orloff v. Willoughby*, 345 U.S. 83, 93 (1953). In the face of a "textually demonstrable" commitment of an issue to "a coordinate political department," *Baker v. Carr*, 369 U.S. 186, 217 (1962), judicial caution is advisable. Even apart from matters of constitutional text, the reservation of judicial judgment on strictly military matters is sound policy. The judicial branch contains no Department of Defense or Armed Services Committee or other ongoing fund of expertise on which its personnel may draw. Nor is it seemly that a democracy's most serious decisions, those providing for common survival and defense, be made by its least accountable branch of government.

It is difficult to imagine a more purely military matter than that at issue in this case — the design of a sophisticated reconnaissance craft that was flying, on the day of Tozer's death, some 50 to 75 feet above the surface of the water at a speed of 500-550 nautical miles per hour. It

should be axiomatic that "considerations of cost, time of production, risks to participants, risks to third parties, and any other factors that might weigh on the decisions of whether, when, and how to use a particular weapon, are uniquely questions for the military and are exempt from review by civilian courts." *In re Agent Orange Product Liability Litigation*, 534 F.Supp. 1046, 1054 n.1 (E.D.N.Y. 1982).

Here, however, the jury was invited to "second-guess military decisions," see *United States v. Shearer*, 105 S.Ct. 3039, 3043 (1985), and to judge the design of a Navy-approved aircraft. Special interrogatory number one inquired of the jury whether defendants were "negligent in the design of the Buick Hood modification," and interrogatory five questioned whether the hood was "defective in that its design rendered it unreasonably dangerous." A group of laymen was thus ineluctably thrust into the intricacies of military technology involving, in the words of the district court, "the structural reaction of the modified Buick Hood panel to aerodynamic forces and loads experienced by the aircraft."

These are judgments, however, which lay men and women are neither suited nor empowered to make. There is a danger in transporting the rubric of tort law and products liability to a military setting and military technology. While jurors may possess familiarity and experience with consumer products, it would be the rare juror — or judge — who has been in the cockpit of a Navy RF-8G off the deck of a carrier on a low level, high speed fly-by maneuver. Moreover, "the United States is required by the exigencies of our defense effort to push technology towards

its limits and thereby to incur risks beyond those that would be acceptable for ordinary consumer goods." *McKay*, 704 F.2d at 449-50. What would pose an unreasonable risk to the safety of civilians might be acceptable — or indeed necessary — in light of the military mission of the aircraft. Cf. Note, *McKay v. Rockwell International Corp.: No Compulsion for Government Contractor Defense*, 28 St. Louis U.L.J. 1061, 1071 (1984) ("Plaintiff's comparison of the jeep to a civilian passenger vehicle was inappropriate since the two vehicles were not made for similar uses.") Difficult choices, trade-offs, and compromises inhere in military planning that simply find no analogue in civilian life. "This is not to say that [military] designers are unconcerned with safety. Rather, they attempt to design as safe a plane as possible within the scope of its mission." *Kropp v. Douglas Aircraft Co.*, 329 F.Supp. 447, 456 (E.D.N.Y. 1971).

The defense protects against judicial interference in military matters in other ways as well. We cannot accept the view that "the danger of interfering with [military] discipline in military contractor cases 'is too remote to be accorded significant weight when the decision only indirectly involves military orders or practices concerning active duty soldiers.'" *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736, 743 (11th Cir. 1985), quoting *Cole v. United States*, 755 F.2d 873, 879 (11th Cir. 1985). The fact that the challenge here does not involve Tozer's immediate commanding officer or relate to matters of personal discipline is irrelevant. Military contractors ordinarily work so closely with the military, see section III, *infra*, that it is nearly impossible to contend that the contractor defectively designed a piece of equipment without actively criticizing

a military decision. Civilian scrutiny of such decisions is generally exerted through executive and legislative oversight on behalf of the public at large, not, as here, through the judiciary at the behest of an individual serviceman. In cases such as these, "members of the armed services would be allowed to question military decisions and obtain relief from actions of military officials." *Bynum v. FMC Corporation*, 770 F.2d 556, 565 (5th Cir. 1985). Trial "would often require members of the Armed Services to testify in court as to each other's decisions and actions." *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666, 673 (1977). While debate over the safety and necessity of advanced weaponry is essential, the First Amendment does not require that the forum be the courtroom or the vehicle be a lawsuit.

The disallowance of recovery in these actions will not leave servicemen or their survivors without relief. The Veterans' Benefits Act "provides a swift, efficient remedy for the injured serviceman." *Stencel*, 431 U.S. at 673. Thus one classic rationale for tort liability — that of compensation of victims — is less compelling in this context. While the Veterans' Act does not provide all elements of damages in the usual wrongful death action, recovery is more reliable, and not "reduced by the high transaction costs present in ordinary products liability litigation." *McKay*, 704 F.2d at 452, n.11.

Forcing military mishaps into the mold of products liability litigation carries one final drawback. Pilots of the Navy and Air Force, whose service and sacrifice make possible the security of this country, are not the military doubles of civilian motorists. Their lives are led in the

company of peril. We can express it no better than Judge Sneed did for the court in *McKay*:

[Pilots] recognize when they join the armed forces that they may be exposed to grave risks of danger, such as having to bail out of a disabled aircraft. This is part of the job. The Nation sometimes demands their very lives. This is an immutable feature of their calling. To regard them as ordinary consumers would demean and dishonor the high station in public esteem to which, because of their exposure to danger, they are justly entitled.

704 F.2d at 453.

III

The second set of reasons for the government contractor defense also has its roots in military soil. Permitting recovery for design defects under any theory of liability risks altering the nature of the procurement process. Specifically, we anticipate that in the absence of the defense, there would be a decrease in contractor participation in design, an increase in the cost of military weaponry and equipment, and diminished efforts in contractor research and development.

Contractor participation in design is essential to the development of a military force that is competitively equipped. Equipment designs often are the result of "continuous back-and-forth" between the military and the contractor. *Koutsoubos v. Boeing Vertol*, 755 F.2d 352, 355 (3d Cir.), *cert. denied*, — U.S. —, 106 S.Ct. 72 (1985). The contractor and the military pool their expertise, matching the latest advances in military technology with the specific dictates of the mission. We recognize this back-and-forth as a reality of the procurement process, as well as a valu-

able part of that process; indeed if military technology is to continue to incorporate the advances of science, it needs the uninhibited assistance of private contractors.

Here the testimony at trial indicated that Vought worked closely with the Navy in developing the specifications for the aircraft. Vought's project manager for the RF-8G program testified that the engineering change proposal that included the Buick Hood modification was "a continual source of discussion" between Vought and the Navy, and that Navy engineers visited Vought every few months for progress reviews. The contractor's participation in design — or even its origination of specifications — does not constitute a waiver of the government contractor defense. If the defense were to be waived by such participation, the contractor would be trapped between its fear of liability and its desire to provide needed ideas and information. The "incentives for suppliers of military equipment to work closely with and to consult the military authorities in the development and testing of equipment" would be lost. *McKay*, 704 F.2d at 450. Without the defense, "military contractors would be discouraged from bidding on essential military projects." *Bynum v. FMC*, 770 F.2d at 566. Thus the defense will be permitted to a participating contractor so long as government approval of design "consists of more than a mere rubber stamp." *Schoenborn v. Boeing*, 769 F.2d 115, 122 (3d Cir. 1985). If there is genuine governmental participation in the design, "the defense is available." *Id.*

Finally, disallowing the government contractor defense might raise the already high costs of military equipment. "Military suppliers, despite the government's im-

munity, would pass the cost of accidents off the the United States through cost overrun provisions in equipment contracts, through reflecting the price of liability insurance in the contracts, or through higher prices in later equipment sales." *McKay*, 704 F.2d at 449. Such pass-through costs would, of course, defeat the purpose of the immunity for military accidents conferred upon the government itself. *Stencel*, 431 U.S. at 673. While distribution of the costs of mishaps to the consuming public may be a familiar feature of products liability law, we are loathe to grant courts and juries a similar power to swell the public costs of meeting the nation's requirements in national security. Though one court has speculated that tort liability would provide legal incentives for "better-designed planes and fewer costly accidents," *Shaw*, 778 F.2d at 742, that judgment is not a matter for the judicial economists but for the Executive in its dealings with contractors and for the Congress in defining the scope of immunities under the Federal Tort Claims Act.

IV.

There remains the application of the elements of the military contractor defense to the facts of this case. In *McKay*, the court held that

a supplier of military equipment is not subject to [strict liability in tort] for a design defect where: (1) the United States is immune from liability under *Feres*

and *Stencel*², (2) the supplier proves that the United States established, or approved, reasonably precise specifications for the allegedly defective military equipment, (3) the equipment conformed to those specifications, and (4) the supplier warned the United States about patent errors on the government's specifications or about dangers involved in the use of the equipment that were known to the supplier but not to the United States.

704 F.2d at 451.

There is no question that Vought qualifies for the government contractor defense under this test. It is undisputed that the United States was itself immune from liability and that the Buick Hood modification conformed to specifications. The jury specifically found that the Navy reviewed and approved "reasonably detailed specifications for the Buick Hood modification," and, further, that the contractor did not fail "to notify the Navy of dangers created by the specifications which were known to defendants but unknown to the Navy."

Nevertheless, the district court upheld the verdict for Tozer on the basis of the jury's findings that defects in the

²In *Feres v. United States*, 340 U.S. 135 (1950), the government was held not liable under the Federal Tort Claims Act for injuries to servicemen in the course of military service. In *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666 (1977), the United States was not required to indemnify a third party for damages paid by it to a member of the Armed Forces injured in the course of military service.

design of the Buick Hood proximately caused plaintiff's death. The district court considered the defense "applicable to a cause of action based on strict liability," but unavailable to a "government contractor who is alleged to have established negligent design specifications."

In so holding, the trial court was in error. The defense applies "equally well to design defect cases based on negligence and/or breach of warranty claims." *Tillett v. J. I. Case Co.*, 756 F.2d 591, 597 n.3 (7th Cir. 1985); see also *Schoenborn*. The policies discussed earlier apply forcefully in either a negligence or a strict liability context. Courts are ill equipped to make military judgments, whatever a plaintiff's theory of recovery. In this case, the jury was instructed that the government contractor defense barred recovery on strict liability, in part to prevent second-guessing of military decisions. But the jury still was compelled to evaluate the negligence claim, and thereby second-guess a design that the United States Navy had sanctioned. The danger that contractors will participate less and charge more stems from the threat of liability for government-approved technology, not from the particular theory of recovery.

In holding that the government contractor defense bars recovery on a theory of negligence as well as strict liability, we join the growing ranks of circuit courts that recognize the utility of the defense and its inescapable function in the deflection of unwarranted judicial oversight over matters of procurement and defense.³ *Koutsoubos v. Boe-*

³ Though the cause of action here was brought under federal law, the defense would apply equally to suits under the diversity

(Continued on following page)

ing Vertol, 755 F.2d 352 (3d Cir. 1985); *Bynum v. FMC*, 770 F.2d 556 (5th Cir. 1985); *Tillett v. J. I. Case*, 756 F.2d 591 (7th Cir. 1985); *McKay v. Rockwell Int'l Corp.*, 704 F.2d 444 (9th Cir. 1983). But see *Shaw v. Grumman Aerospace*, 778 F.2d 736 (11th Cir. 1985). This case involves no more than a standard application of such principles. The judgment of the district court is accordingly reversed and remanded for entry of judgment in favor of defendants.

REVERSED AND REMANDED.

(Continued from previous page)

jurisdiction. "With regard to the government contractor defense, most of the courts that have considered the matter have found that, at least when military design specifications provided by the government are at issue, product liability actions are likely to involve matters that are subject to exclusive federal control and necessitate the limited imposition of federal common law." *Bynum*, 770 F.2d at 567, et seq. The fact that a claim arises under state law does not, of course, preclude a federal defense in an area of paramount federal interest. *Id.*, Note, *Government Contract Defense: Sharing the Protective Cloak of Sovereign Immunity After McKay v. Rockwell International Corp.*, 37 Baylor L. Rev. 181, 214 (1985).

A24

UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT

No. 85-2264

Delbert Boyle, etc.,

Appellee,

versus

United Technologies Corporation,

Appellant,

and

Sikorsky Aircraft,

Defendant.

Appeal from the United States District Court for the Eastern District of Virginia, at Richmond. Richard L. Williams, District Judge.

(Filed June 25, 1986)

The appellee's petition for rehearing and suggestion for rehearing in banc were submitted to this Court. As no member of the Court requested a poll on the suggestion for rehearing in banc, and

As the panel considered the petition for rehearing and is of the opinion that it should be denied,

IT IS ORDERED that the petition for rehearing and suggestion for rehearing in banc are denied.

Entered at the direction of Judge Wilkinson, with the concurrence of Judge Russell and Judge Hall.

For the Court,

JOHN M. GREACEN
CLERK

A25

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA

Richmond Division

Civil Action No. 84-0486-R

DELBERT BOYLE,

Plaintiff,

v.

UNITED TECHNOLOGIES CORP.,

Defendant.

ORDER

(Filed July 7, 1986)

Obedient to the Fourth Circuit's mandate and opinion of May 27, 1986, the Court hereby VACATES the judgment heretofore entered in favor of the plaintiff. Judgment is ENTERED in favor of the defendant, and this action is DISMISSED with prejudice, with costs to the defendant.

Let the Clerk send a copy of this order to all counsel of record.

/s/ Richard L. Williams
UNITED STATES DISTRICT JUDGE

DATE July 7, 1986

OPPOSITION BRIEF

86-492

No. 86-

Supreme Court, U.S.

FILED

OCT 6 1986

JOSEPH F. SPANIOL, JR.
CLERK

IN THE
Supreme Court of the United States

October Term, 1986

DELBERT BOYLE, Personal Representative Of The
Heirs and Estate of David A. Boyle, Deceased,
Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,
Respondent.

ON PETITION FOR A WRIT OF CERTIORARI TO
THE UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT

RESPONDENT'S BRIEF IN OPPOSITION

LEWIS T. BOOKER
LONNIE D. NUNLEY, III
Hunton & Williams
707 East Main Street
P. O. Box 1535
Richmond, Virginia 23212
(804) 788-8200

Counsel for Respondent

October 6, 1986

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IN THE Supreme Court of the United States

October Term, 1986

No. 86-

DELBERT BOYLE, Personal Representative Of The
Heirs And Estate Of David A. Boyle, Deceased,
Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,
Respondent.

ON PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FOURTH CIRCUIT

_____ RESPONDENT'S BRIEF IN OPPOSITION _____

Respondent United Technologies Corporation respectfully requests that this Court deny the petition for writ of certiorari seeking review of the opinion of the United States Court of Appeals for the Fourth Circuit.

OPINIONS BELOW

The opinion of the United States Court of Appeals for the Fourth Circuit is reported at 792 F.2d 413 (1986). The order of the United States Court of Appeals for the Fourth Circuit denying the petition for rehearing and suggestion for rehearing in banc was not reported. It is reprinted in the appendix at page A1.

STATEMENT OF THE CASE

A. THE PROCEEDINGS BELOW

This action was tried before a jury in the United States District Court for the Eastern District of Virginia at Rich-

mond. At conclusion of the Petitioner's evidence, and again at conclusion of the trial, Respondent moved for a directed verdict in its favor. Both motions were denied.

The case was then submitted to the jury. The jury returned a verdict of \$725,000.00 against Respondent. The trial court entered judgment on the verdict. On August 2, 1985, Respondent filed motions for judgment notwithstanding the verdict or, in the alternative, for a new trial on all issues. The motions were denied without formal opinion by the district court, and final judgment was entered September 10, 1985, by the district court.

Respondent appealed to the United States Court of Appeals for the Fourth Circuit. The Fourth Circuit reversed the decision of the district court. Petitioner filed a petition for rehearing and suggestions for rehearing in banc with the United States Court of Appeals for the Fourth Circuit. The Fourth Circuit denied the petition and remanded the case with directions to the district court that judgment be entered for Respondent. The judgment was duly entered.

B. STATEMENT OF THE FACTS

Petitioner's evidence at trial tended to show that a CH-53D helicopter built by Respondent and delivered by Respondent to the United States Navy in 1970 made a right turn at low altitude off Virginia Beach, Virginia on April 27, 1983. While executing this low altitude turn, the helicopter crashed into the ocean. Three of the four crew members aboard evacuated through the water without harm. Petitioner's decedent, the helicopter's copilot, did not successfully evacuate and was found by Navy divers during recovery of the downed helicopter.

Petitioner's decedent was seated next to an emergency escape hatch. He apparently made no attempt to open it. While Petitioner contends that the escape hatch was negligently designed in that it had to be pushed out against the water, in fact the pilot was able to push out his escape hatch and depart the helicopter safely.

Petitioner alleged that the helicopter crashed into the water and decedent subsequently drowned because Respon-

dent had been negligent and had breached warranties in overhaul work performed on the helicopter and in the design of the helicopter. Specifically, Petitioner alleged that Respondent was liable for allowing contaminants to enter the helicopter's hydraulic flight control system during overhaul of that system by Respondent and for a defectively designed copilot's escape hatch. The Petitioner also alleged that a small metallic chip caused a malfunction in the helicopter's servo flight-assist mechanism and that that, in turn, caused the helicopter to crash.

The evidence established at least three possible sources for introduction of the metallic chip. The United States Government returned the servo to Respondent for routine overhaul in late 1981 or early 1982. The chip could have been introduced at that time, although the undisputed evidence at trial was that Respondent had no metal corresponding to the metallic chip at its overhaul facility. In late 1982 the United States Government itself reworked the servo at the Naval Air Rework Facility, Pensacola, Florida. The chip could have been introduced at that time. The hydraulic system was regularly maintained aboard ship. This maintenance included injection of new hydraulic fuel, repairs of leaks in the system, and repacking of fittings in the system. The chip could have been introduced during any of these procedures.

The CH-53 class helicopters were built to specifications of the United States Navy, not Respondent. The design was let out by the United States for competitive bidding. Respondent was the successful bidder. Respondent and the United States Navy then worked together in preparation of detailed specifications. After give and take in the development of the detailed specifications the United States Government approved and promulgated the detailed specifications under the auspices of the United States Navy.

During the course of securing United States approval of the plans and specifications, Respondent built a cockpit mock-up showing the location and configuration of all instruments, controls and facilities in the cockpit, including the location of the copilot's emergency escape hatch. The United

States Government approved the design and the location. After receiving government approval, Respondent began to manufacture CH-53 helicopters. The helicopter in question was delivered to the United States Navy, and accepted and approved by it, in 1970.

REASONS FOR DENYING THE WRIT

1. This Court should not grant certiorari to review sufficiency of evidence and matters of state law in product liability cases.

Petitioner invoked diversity jurisdiction in the district court as the basis for subject matter jurisdiction. The parties agreed that Virginia law would be the substantive law of the case. (Petition for Writ of Certiorari, p. 4).

This case was tried in the United States District Court for the Eastern District of Virginia and was argued in the United States Court of Appeals for the Fourth Circuit primarily as a state-based common law product liability action. Most of the Petitioner's expert evidence at trial was designed to show that the servo had jammed, thus causing the accident, because Respondent had allegedly defectively overhauled the servo. Only when the case reached this Court did Petitioner begin to lay such heavy emphasis upon the government contractor defense.

Whether the chip could have caused the malfunction, and the origin of the chip, were disputed issues at trial. The evidence of trial suggested several possible modes of introduction of the chip into the hydraulic system.

On appeal, applying Virginia product liability law, the Fourth Circuit held that Petitioner had failed to carry the burden of proof on the issue of the origin of the chip. *Boyle v. United Technologies Corp.*, 792 F.2d 413, 415 (4th Cir. 1986). The Fourth Circuit held that Petitioner's evidence failed to "eliminate the possibility that the blame attaches to some party other than Sikorsky." *Boyle*, 792 F.2d 413, 416;

quoting *Logan v. Montgomery Ward*, 216 Va. 425, 429, 219 S.E.2d 685, 688 (1975). Accordingly, the Fourth Circuit ruled that "a defendant whose responsibility is not affixed with reasonable certainty is entitled to judgment as a matter of Virginia law." *Boyle*, 792 F.2d 413, 416.

The Petitioner's writ should be denied because granting it would involve this Court in a review of the evidence and the inferences drawn in what is essentially a common law product liability action. See *General Pictures Co. v. Electric Co.*, 304 U.S. 175, 178 (1938); citing *Southern Power Co. v. N. C. Public Service Co.*, 263 U.S. 508 (1924); *United States v. Johnston*, 268 U.S. 220, 227 (1925) ("We do not grant certiorari to review evidence and discuss specific facts.").

Review by this Court of the Fourth Circuit Court of Appeals' application of Virginia law would not involve a "legal controversy of importance" or the resolution of a "direct conflict as to the factual issues." Hence certiorari is not warranted. See R. Stein, E. Gressman, S. Shapiro, *Supreme Court Practice*, 217 (6th ed. 1986). The Fourth Circuit held, as a matter of Virginia law, that Petitioner's evidence failed to reach the level necessary to create a jury question. *Boyle*, 792 F.2d 413, 416. This Court should decline certiorari to review a court of appeals' determination as to the sufficiency of the evidence to present a jury question, just as it declines certiorari to review the sufficiency of evidence to support a jury verdict. See R. Stein, E. Gressman, S. Shapiro, *Supreme Court Practice*, 220.

2. This Court has previously denied certiorari to review the military contractor defense applied in this case by the fourth circuit.

Petitioner alleged that Respondent was negligent in the design of the copilot's escape hatch. The Fourth Circuit, applying the criteria for the military contractor defense estab-

lished in *McKay v. Rockwell International Corp.*, 704 F.2d 444, 448 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984), held that Respondent satisfied the requirements of the defense and thus could incur no liability for the alleged defective design of the escape hatch. *Boyle*, 792 F.2d 413, 415.

Petitioner asks this Court to grant certiorari to review the propriety of the government contractor defense as that defense was applied by the Fourth Circuit. The government contractor defense applied by the Fourth Circuit is stated in the same terms by the Third, Fifth, Seventh and Ninth Circuits. *See*, respectively, *Koutsoubos v. Boeing Vertol*, 755 F.2d 352 (3rd Cir. 1985); *Bynum v. FMC*, 770 F.2d 556 (5th Cir. 1985); *Tillett v. J. I. Case*, 756 F.2d 591 (7th Cir. 1985); and *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983). This Court has previously refused to grant certiorari to review the government contractor defense. *Koutsoubos v. Boeing Vertol*, 755 F.2d 352 (3rd Cir.), *cert. denied*, _____ U.S. _____, 106 S. Ct. 72, 88 L.Ed.2d 59 (1985); *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir.), *cert. denied*, 464 U.S. 1043 (1984).

The petitioner seeks to justify a writ of certiorari in this case by contending that there is a conflict between the government contractor defense as announced in the Third, Fourth, Seventh and Ninth Circuits, on the one hand, and the defense as announced by the Eleventh Circuit in *Shaw v. Grumman Aerospace Corporation*, 778 F.2d 736 (1985). A petition for writ of certiorari is pending in this Court to review the decision in the *Shaw* case. Respondent submits that the government contractor defense applied by the Fourth Circuit, adopted from *McKay* and *Koutsoubos*, is the proper formulation of the defense. This Court can address the Eleventh Circuit's formulation, if it so chooses, by granting a writ in *Shaw*.

Even by the more rigorous standards announced by the Eleventh Circuit in *Shaw v. Grumman* the government contractor defense is available to Respondent here. Respondent bid on a set of specifications established by the Navy and worked closely with the Navy in preparing a cabin mock-up

and working drawings and specifications. The Navy was as aware of any alleged deficiencies in the escape hatch as Respondent was. Indeed, the uncontradicted evidence at trial showed the escape hatch worked perfectly when the pilot used it and safely escaped from the helicopter. The only reason this case is in the courts today is because the decedent made no attempt to use the escape hatch which would have saved his life. Certiorari does not lie to review that lapse in his judgment.

CONCLUSION

For these reasons, the petition for writ of certiorari should be denied.

Respectfully submitted,

LEWIS T. BOOKER
LONNIE D. NUNLEY, III
Hunton & Williams
707 East Main Street
P. O. Box 1535
Richmond, Virginia 23212
(804) 788-8200

COUNSEL FOR RESPONDENT

A-1

APPENDIX

**UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT**

No. 85-2264

Delbert Boyle, etc.,

Appellee,

versus

United Technologies Corporation,

Appellant,

and

Sikorsky Aircraft,

Defendant.

**APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA, AT
RICHMOND. RICHARD L. WILLIAMS, DISTRICT JUDGE.**

The appellee's petition for rehearing and suggestion for rehearing in banc were submitted to this Court. As no member of the Court requested a poll on the suggestion for rehearing in banc, and

As the panel considered the petition for rehearing and is of the opinion that it should be denied,

IT IS ORDERED that the petition for rehearing and suggestion for rehearing in banc are denied.

Entered at the direction of Judge Wilkinson, with the concurrence of Judge Russell and Judge Hall.

For the Court,

JOHN M. GREACEN

Clerk

**JOINT
APPENDIX
VOL. I**

No. 86-492

Supreme Court, U.S.
FILED

FEB 25 1987

JOSEPH F. SPANGL, JR.
CLERK

In The
Supreme Court of the United States
October Term, 1986

DELBERT BOYLE, personal representative of the
Heirs and Estate of David A. Boyle, deceased,
Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,
Respondent.

On Writ of Certiorari to the United States
Court of Appeals for the Fourth Circuit

JOINT APPENDIX
Volume I—Pages 1 to 340

LOUIS S. FRANECKE, Esq.
JOHN O. MACK, Esq.
MACK, HAZLEWOOD,
FRANECKE & TINNEY
221 Pine Street, Suite 600
San Francisco, CA 94104
415/391-1560

MICHAEL MOORE, Esq.
CARTWRIGHT, SUCHERMAN
& SLOBODIN, INC.
101 California Street,
26th Floor
San Francisco, CA 94111
415/433-0440

Counsel for Petitioner

LEWIS T. BOOKER, Esq.
LONNIE D. NUNLEY, III, Esq.
HUNTON & WILLIAMS
707 East Main Street
P.O. Box 1535
Richmond, VA 23212
804/788-8200

Counsel for Respondent

Petition for Writ of Certiorari filed September 23, 1986
Certiorari granted January 12, 1987

245pp

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Defendant's Exhibit 24, Sikorsky Form 209-5	574
Defendant's Exhibit 31, Internal Correspondence from K. Wallischek to T. Dixon dated June 3, 1983	575
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Defendant's Exhibit 41, Photograph showing escape from escape hatch of CH-553D helicopter	584

CIVIL DOCKET CONTINUATION SHEET

Plaintiff

DELBERT BOYLE, ETC., ET AL.

Defendant

UNITED TECHNOLOGIES CORP.

Docket No. CA-84-0486-R

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Date	NR.	Proceedings	
1985			
July 12	—	Pltf's Proposed Jury Instructions. rec'd.	len
July 15	46	Deft's List of Exhibits, filed.	len
July 15	—	Deft's Proposed Jury Charges, rec'd.	len
July 17	54	PLtf's Objections to Deft's Proposed Exhibits At Trial, filed.	len
July 17	55	Deft's Objections to Pltf's List of Exhibits, filed.	apr
July 19	56	Deft's Reply Memorandum in Support of Motion in Limine, filed.	apr
July 19	57	Pltf's List of Exhibits, filed.	apr
July 22	58	Stipulated Facts, filed.	afw
July 22	—	JURY TRIAL PROCEEDINGS: Williams, J. Halasz, OCR. Appear- ances: Parties by counsel, Jury. Jury sworn & examined on voir dire. Jury empaneled with one alternate; sworn to try issue. Witnesses excluded on motion of parties. Opening state- ments made. Stipulations of parties read to jury. Pltf adduced evidence. Case cont'd until tomorrow at 9 A.M. (7 Hours 3 Mins.)	JWH
July 23	59	ORDER granting deft's motion in limine ent'd 7-23-85 (RLW) filed. Copies hand delivered to counsel for the parties.	JWH

Cont'd on Page 3

Date	NR.	Proceedings	
July 23	—	JURY TRIAL PROCEEDINGS (2ND DAY): Williams, J. Halasz, OCR Appearances: Pltf with counsel, deft by counsel, jury. Pltf adduced further evidence. Depositions of (1) Terrence J. Fox, and (2) Jesse Clemons used in trial & filed on behalf of pltf. Deft's motion to exclude issue of punitive damages heard; granted. Punitive damages issue dismissed. Deft's motion for a directed verdict on flotation issue heard; granted. Pltf rested. Deft's motion for a directed verdict on all issues heard; denied. Case to go to Jury on implied warranty issue. Deft adduced evidence. Case cont'd until tomorrow at 9:30 AM. (8 Hours)	JWH
July 23	—	Deposition of TERENCE J. FOX <i>used in trial and filed.</i>	JWH
July 23	—	Deposition of JESSE CLEMONS used in trial and filed.	JWH
July 24	—	JURY TRIAL PROCEEDINGS (3RD DAY): Williams, J. Halasz, OCR Appearances: Pltf with counsel, deft by counsel, jury. Deft adduced further evidence; rested. Deft's renewed motion for a directed verdict on all issues heard; denied. evidence concluded. Arguments of counsel heard. Jury charged by the Court. No further objections noted to the charge. Alternate Juror discharged. Jury retired. Inquiry of the jury received; answered. Jury returned verdict in favor of the plaintiff in the sum of \$725,000.00 Jury discharged. Clerk to enter judgment on the Jury Verdict. (6 Hours 8 Mins.)	JWH

Date	NR.	Proceedings	
July 24	60	Jury Verdict filed.	JWH
July 24	61	Judgment on Jury Verdict entered by the Clerk 7-24-85 filed. Certified copies to counsel of record.	JWH
Aug.	1 62	Pltf's Bill of Costs, filed.	len
Aug.	2 63	Deft's Motion For Judgment Not- withstanding The Verdict Or, In The Alternative, For A New Trial, filed.	len
Aug.	2 64	Deft's Memorandum of Law In Support of Motion For Judgment Notwithstanding the Verdict Or, In The Alternative, For A New Trial, filed.	len
Aug.	9 65	Pltf's Brief in Opposition to Deft's Motion for Judgment notwithstanding the verdict, Filed.	afw
Aug.	14 66	Deft's Reply Memorandum In Support of Motion For Judgment Notwithstanding The Verdict Or, In the Alternative, For A New Trial, filed.	len
Aug.	21 —	Transcripts of Trial before Hon. Richard L. Williams in III Vols., filed.	len
Sept.	10 —	IN OPEN COURT: Williams, J., Halasz, OCR. Parties by counsel. Matter came on for hearing on deft's motion for judgment notwithstanding the verdict or in the alternative for a new trial. Arguments had. Motion denied. Findings of fact & conclusions of law stated from the bench. Order to enter. (1 hr. 07 mins.)	len
Sept.	10 67	ORDER , that for the reasons stated from the bench the Court denies deft's motion for judgment notwithstanding the verdict, or in the alternative, for a new trial. Supersedeas bond, if	

requested, for appeal shall be set at \$750,000.00. Ent. by RLW on 09/10/85 & filed. Cps. mailed.

len

Oct. 10 68 Deft's Notice of Appeal, filed. Fee paid. TPO mailed to counsel f/deft.

sjl

Oct. 10 69 Deft's Supersedeas Bond, filed. APPROVED, Ent by RLW on 10/11/85, filed. Cps. mailed.

sjl

Nov. 1 — Transcript of Proceeding held Sept. 10, 1985, filed.

sjl

Nov. 4 — Appeal Record, VIII Vols., del'd to USCA.

pks

1985

Nov. 1 — Portion of Pltf's Trial Exhibits not sent to 4th Circuit del'd to counsel for the pltf.

JWH

1986

May 28 70 Per Curiam Opinion of USCA REVERSING decision of USDC, filed.

jlm

July 3 71 JUDGMENT of 4th Circuit filed 5/27/85 reversing & remanding for further proceeding consistent with opinion rec'd and filed.

lkm

July 3 — Record on appeal in 8 volumes returned from 4th Circuit to District Court.

lkm

July 7 72 ORDER vacating judgment heretofore entered in favor of pltf; entering judgment in favor of deft; dismissing action with prejudice with costs to deft; ent'd, RLW, filed. Copies mailed.

lkm

1987

Jan. 28 73 ORDER of Supreme Court of U.S. ALLOWING Certiorari, filed.

jlm

Feb. 3 — Appeal record in 8 vols. returned to 4th Circuit.

jlm

IN THE
UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT

Record No. 85-2264

UNITED TECHNOLOGIES CORPORATION,

Appellant,

v.

DELBERT BOYLE, personal representative of the Heirs
and Estate of David A. Boyle, deceased,

Appellee.

On Appeal From The United States District Court
For the Eastern District Of Virginia
Richmond Division

BRIEF OF APPELLANT
UNITED TECHNOLOGIES CORPORATION

Lewis T. Booker

Lonnie D. Nunley, III

HUNTON & WILLIAMS

707 East Main Street

P. O. Box 1535

Richmond, Virginia 23212

Counsel for Appellant

December 13, 1985

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* * *

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
RICHMOND DIVISION

DELBERT BOYLE, PERSONAL
REPRESENTATIVE OF THE
HEIRS AND ESTATE OF
DAVID A. BOYLE, DECEASED,

Plaintiffs

vs.

Case # 84-0486-R

UNITED TECHNOLOGIES COR-
PORATION,

April 2, 1985

Defendant

DEPOSITION OF JESSE CLEMONS

APPEARANCES:

FOR THE PLAINTIFF:

MACK, HAZELWOOD, FRANECKE &
TINNEY
221 Pine Street, Suite 500
San Francisco, CA 94104

BY: LOUIS S. FRANECKE, Esq.

FOR THE DEFENDANT:

HUNTON & WILLIAMS
707 East Main Street
P. O. Box 1535
Richmond, VA 23212

BY: LEWIS T. BOOKER, Esq.

* * *

(p. 3) Q Mr. Clemons, would you state your name, please?

A Jesse Clemons.

Q And your present address?

A 60 Walnut Street, Stratford, Connecticut.

Q By whom are you presently employed?

A Sikorsky Aircraft Company.

Q How long have you been so employed?

(p. 4) A Approximately twelve and a half years.

Q And in what capacity?

A Design engineer.

Q Any particular design group?

A It's hydraulic mechanical flight controls.

Q Are you a part of the Sikorsky accident investigative group?

A No, I am not.

Q Prior to about twelve years ago, I think, who were you employed then by?

A Lockheed Aircraft Corporation.

Q Where was that?

A Marietta, Georgia.

Q What general type of employment did you have with them?

A Design engineer, mechanical flight controls.

Q Was that also hydraulics?

A No, that was mechanical, just mechanical.

Q Prior to coming to Sikorsky, had you been involved with design engineering having to do with hydraulics?

A No.

Q Briefly, what is your educational background?

A BS degree in mechanical engineering.

(p. 5) Q Where from?

A Finley Engineering College, Kansas City, Missouri.

Q What year was that?

A 1958.

Q Any military?

A Yes, three years in the Coast Guard.

Q Have you ever had your deposition taken before?

A No.

Q Mr. Clemons, prior to April of 1983, did you have occasion to ever investigate any other accidents pertaining to Sikorsky Aircraft product?

A Yes.

* * *

(p. 7) Q Did you have occasion to examine the wreckage pertaining to an accident of a CH-53D marine helicopter that crashed on 27 April 1983?

A Yes, I did.

Q Did you go with Mr. Conroy to Norfolk to examine the wreckage when it first came out of the ocean?

A Yes.

Q Prior to that time, had you done any investigative work pertaining to the investigation of the crash?

A No.

Q What did you do, in general, when you got there at Norfolk? Give me an overview of that week that you were there?

A When they removed the ship or the aircraft from the ship, it was taken into a hangar on a trailer and we did a visual check of the control systems to see if we could find any evidence of a bind or a disconnect anywhere in the control system.

(p. 8) Q Anything else that you personally were involved in in looking at?

A We found nothing. Our next step was to see if the controls moved freely and they did.

Q Did you personally move the controls?

A Yes, I did.

Q How often did you move them around?

A I don't really know, probably a half dozen times.

Q Did you feel any kind of binding or ratcheting in the system?

A No.

Q Was the power on or off when you did this maneuver?

A It was off.

Q Did you ever move the controls with the power on?

A Not on that aircraft.

Q By "power," I mean the various hydraulic systems being on, you understand?

A Yes.

Q You understand that?

A Yes, I do.

Q You didn't feel any binding mechanical difficulties with the movement?

A No.

(p. 9) Q I note Exhibit 71(d) from your file appears to be a letter from Sedlock, is that correct?

A Yes.

Q And then it goes to you as one of the copied recipients, is that correct?

A Yes.

Q Was this a document prepared before or after you went to Norfolk?

A That was after.

Q Who is Mr. Sedlock?

A He's a design engineer with Sikorsky Aircraft.

Q Was Mr. Sedlock there at the accident investigation scene at Norfolk?

A No. He was at Pensacola with us.

Q Is he from Pensacola as far as you know?

A No, he's assigned to West Palm Beach at our facility there.

Q But he assisted over at Pensacola?

A Yes.

Q Did he assist in Norfolk?

A No.

Q Okay, you moved the various control movements around. Did you do anything else mechanically with regard to moving (p. 10) the controls to determine whether or not there was any binding or mechanical failure that you know of?

A Not at Norfolk, no.

Q Is there anything else that you checked at Norfolk?

A We put the rigging pins in the system to verify that the system was properly rigged.

Q Was it?

A Up to the main rotor servo. That's as far as we could go because of the damage to the main rotor head. Up to that point, all pins went in freely.

Q There was too much damage in the servos, rotor servos to make an accurate determination?

A Yes.

Q Did you check to see the movement of the pilot's and co-pilot's cyclic stick—strike that.

Did you determine whether or not the pilot's or co-pilot's cyclic stick was off center by two inches or so?

A Yes, we did.

Q Was that part of your mechanical check or was that something you did later?

A That was something we did at Norfolk. Basically what we did there is we know what the distance between the two sticks should be and we just simply measured that distance and (p. 11) saw that it wasn't the 48 inches that it should be.

Q Okay, did you go underneath the floorboards to see if there was anything that contributed to the off-centeredness of the co-pilot's stick?

A At Pensacola we did. The parts were sent to Pensacola.

Q Do you mean the parts of the control stick and the push rods were center to Pensacola?

A Yes, they were.

Q What else did you do at Norfolk? You have done the rigging pins. You mechanically moved the stick. What else did you do?

A We removed all of the servo actuators and virtually all of the mechanical linkages in the control system to send to Pensacola for further investigation.

Q Did you examine any of the primary servos at Norfolk to determine whether or not they would move freely or not?

A No.

Q Did you take any photographs?

A I personally did not.

Q Did Mr. Conroy?

A Yes, he did.

Q Did you do any checking of pressures or fluid samples (p. 12) of any of the hydraulic system while you were there at Norfolk?

A I personally didn't, no.

Q Do you know if anybody did?

A I believe Mr. Terry Fox did. I am not positive, but I believe that he did take samples from the aircraft.

Q Mr. Fox was there at Norfolk?

A Yes, he was.

Q Were you working alongside or with Mr. Fox, to to speak?

A Yes.

Q Did you take any oil samples from the hydraulic system when they took the servos off?

A Not at that time. We capped all the ports on the servos and when they got to Pensacola, they did take flood samples from all of the servos there.

Q That wasn't done in Norfolk?

A No.

Q All right, did you do anything else other than what you have just told me? You checked the mechanical movement of the stick. You checked the rigging by putting in the rigging pins and that sort of thing up to the main rotor head and you removed all the servos. Did you do anything else other than that?

A Just visual inspection of the entire control system (p. 13) to look for binds or disconnects, any sort of damage.

Q Pins that might have been broken or something like that?

A Yes.

Q Did you find anything that appeared to be a failure other than impact damage?

A We found some, at crack in one of the mixer support fittings.

Q Was that of significance to you?

A No.

Q Was it a possibility of causing any or was it a possibility of contributing to the accident crash as you understood it?

A Not in my opinion.

Q Anything else that you found in your visual or otherwise inspection at Norfolk?

A The only thing I can recall is there was a disconnect in the power takeoff from the mixer. I believe that's covered in some of the notes there.

Q Did that have any significance to you with regard to the sequence of the crash?

A No.

Q Exhibit 71(c) is a copy, I believe. Are these your (p. 14) notes?

A Yes.

Q Are these notes you took at Norfolk or in Pensacola?

A Most of them were in Norfolk. There, in the back there may be some from Pensacola.

Q These are indicating your impressions as you were observing the various parts of wreckage.

A Yes. I just wrote down the dimensions that I had taken and just my own personal observations.

Q You went to Pensacola, is that correct?

A Yes.

Q And that was with the various servos and push rods, that sort of thing?

A Yes.

Q What did you do when you were in Pensacola?

A I was there primarily as a witness. They did run an acceptance test on all of the servos.

Q That was a bench test?

A Yes, it was.

Q Is this according to the maintenance manual?

A Yes, it is a test that they give to any servo prior to putting it on an aircraft.

Q How did the servos check out?

(p. 15) A All in all, they checked out very well. There was a problem with the pitch AFCS servo.

Q What was wrong with the pitch AFCS servo?

A The trim would not drive in one direction. There was a broken spring in the shuttle valve within the servo.

Q Did that affect the performance of the servo valve?

A It would prevent it from driving in trim in one direction. However, the servo had been in salt water for 24 hours or more prior to testing.

Q Anything else that was out of the specifications with regard to the various AFCS servos?

A I don't recall anything.

Q What about the—okay, did you notice any of the maintenance plates on the various servos indicating times of rework or rework activity?

A I recorded the name plate information somewhere in my notes there.

Q Could you find that for me, if you would sir?

A (Witness checking exhibit.)

These are the four AFCS servos, part number, serial number. These numbers 4Q80, that indicates that it was either manufactured or overhauled in the fourth quarter of 1980.

Q Okay. And these were from various tags or plates that (p. 16) were on the various servos?

A Yes, that's correct.

Q On the roll AFCS servo, I notice you recorded here "NARF Pensacola fourth quarter '82," is that correct?

A No, it is, roll is this one first quarter '82.

Q Right.

A I do have NARF Pensacola fourth quarter '82 and that indicates that it had been back at NARF in fourth quarter of '82.

Q The servo site in the aircraft looking forward, which servo is on the outside?

A Can I refer to my schematic here?

Q Of course. By the way, refer to anything you wish as you go along.

A As you are looking forward, the AFCS servo would be on the right hand to outboard side.

The next one, inboard, would be the collective. The next one, inboard, could be the roll and the most inboard servo would be the YAW.

Q Now, do you remember seeing whatever it was that indicated that NARF Pensacola had done work on the roll servo.

Do you recall that?

A It would have been stamped on the nameplate.

(p. 17) Q Is it a tag or is it an actual stamp on the nameplate?

A I don't recall. It would be one of the two.

Q Did you check with NARF Pensacola to determine what work had been done on roll AFCS servo?

A No, I did not.

Q Did you ever see any documents or maintenance records pertaining to what work was done at NARF?

A No.

Q Did you ever discuss it with anybody as to what work Pensacola may or may not have done to the roll servo?

A You are referring to prior to the accident?

Q Yes, prior to the accident.

A No, I did not.

Q As a part of the overhaul of the various roll servos, is it part of that maintenance program to take apart the Moog valve?

A I don't think so. I don't know for certain. I think what is done is they test that valve to its own acceptance test procedure. If it does not pass that, then it would be disassembled.

Q Is the Moog valve downstream or upstream of the input filter into the AFCS roll servo?

(p. 18) A It would be downstream.

Q I mean, just as a general comment, the filter is the first thing that the inputting oil sees, more or less, when it is coming into the servo?

A Yes.

Q Is there an output filter also?

A No.

Q Is there a second filter in the AFCS roll servo besides the input filter?

A No. There might be a screen on that valve. I am not sure of that.

Q Did you observe the teardown of the various AFCS servo cylinders?

A Yes.

Q Did you participate by actually, physically assisting in the teardown?

A Just as an observer.

Q You just watched?

A Yes.

Q Did you examine the various parts of the servos as they were taken apart?

A Yes.

Q Did you find anything to be out of the ordinary with (p. 19) regard to the various servos as they were taken apart?

A That broken spring that we mentioned previously was the only thing that I recall seeing.

Q Did you observe the teardown of the roll AFCS servo cylinder?

A Yes.

Q Did you find anything amiss with regard to the roll AFCS cylinder?

A No.

Q Did you examine it in detail?

A Yes.

Q Did you use a microscope or a looking glass or something like that?

A No, I did not participate in the teardown of the Moog valve. That was done later.

Q That's what my next question was. Okay.

Did you take any hydraulic oil or fluid samples from the roll AFCS servo cylinder?

A Pensacola did.

Q Did you?

A No, not personally.

Q I gather you were not present when the Moog valve was taken apart?

(p. 20) A No, I was not.

Q Did you record any of the nomenclature on the Moog valve such as its date of manufacture, rework or anything like that?

A No, I did not.

Q Do the moog valves have on them a plate indicating when rework was done on them?

A I cannot answer that. I don't know.

Q I gather that the metallic chip that was indicated by Mr. Fox as possibly causing the accident was not found while you were there at Pensacola?

A No.

Q Did you ever see the metallic chip at some other time?

A No.

Q Were you ever present in Norfolk when the metallic—well, did you ever see the metallic chip at any time?

A No.

Q Have you ever seen any photographs of it?

A I believe I have seen photographs, yes.

* * *

(p. 21) Q Let me show you a copy of the last page of Exhibit 1 for identification which I believe is a copy of a schematic for a roll servo cylinder, is that correct?

A Yes, it is a cyclic AFCS servo. It doesn't say whether it is roll or pitch.

Q Now, did you ever talk to Mr. Fox as to whether the chip was found in the servo cylinder?

A No.

Q Did you ever determine from someone else where the chip was found by Mr. Fox in the servo cylinder?

A It would have been in this valve which is a second stage of the AFCS servo valve.

Q Was it the second or first stage valve? I thought it was the first. They are identical, I believe.

A I think it was in the first stage valve, but this is the second stage of this valve.

Q It's the pilot or commonly called the pilot valve?

A Yes.

Q And that's an integral part of the moog valve assembly?

(p. 22) A Yes.

Q If I understand correctly, the pilot valve is the valve that will move back and forth opening ports allowing the hydraulic fluid pressure to go down and move the power piston, is that correct?

A That's correct.

Q And if the pilot valve were jammed in an open position to one of the ports, it would then drive the power piston one way or the other, is that generally correct?

A Yes.

Q Have you personally participated in maintenance procedures associated with these AFCS servo cylinders?

I mean, have you done it yourself, taken these apart and that sort of thing?

A No.

Q Have you observed being done other than down in Pensacola?

A Yes, I have.

Q Have you observed the various maintenance procedure at Sikorsky with regard to reworking the various AFCS servo cylinders?

A I have witnessed a good bit of the testing and some of the disassembly and assembly. I haven't witnessed an entire (p. 23) overhaul procedure on a servo.

Q Did you observe the various—at Pensacola had you observed the teardown of the various filters of the hydraulic system involved in the subject aircraft?

A I don't recall other than just taking them out.

Q Did you see any contaminants in the various filters?

A I don't recall seeing anything significant.

Q In your notes, and let me show you this, of Exhibit 17(c), the largest paragraph on the bottom starting with "Cyclic stick moves farther . . ." Do you see that?

A Yes.

Q You are indicating that "When the cyclic stick moves to the right, the AFCS servo bottoms first and the stick can be moved two or three inches before stick stop is contacted. Do you see that?"

A Yes.

Q Are you referring to the pilot's or the co-pilot's stick?

A They would be both moving together.

Q Now, is that within the design tolerances associated with this particular movement of the cyclic stick?

A The reason I noted this is because going both left and right, the servos should have bottomed before you contact (p. 24) the stick stop.

Q It is supposed to do it that way?

A Yes.

Q But indicating when moving to the left the secondary stop is contacted first, is that correct?

A Yes.

Q Did that have any significance to you with regard to a possible contributing cause of the accident?

A No. The amount of travel that was lost was very, very slight. I didn't feel it had a bearing.

Q Do you recall whether the roll AFCS servo cylinders' shear pin was sheared or not when you observed it in Norfolk?

-A To my knowledge, it was not.

Q What is the purpose of the shear pin on the roll AFCS servo cylinder?

A That's in the event you do get a jam in that pilot valve, the pilot could overcome the jam and free the controls.

Q Did you test to see what force would be required to shear the shear pin with regard to the roll servo cylinder involved in this accident?

A I did not.

Q Do you know if anybody did?

A I believe that Mr. Fox did.

(p. 25) Q If a pilot were receiving a hardover in the roll AFCS servo cylinder started or precipitated by a jammed pilot valve in the number one AFCS servo moog valve, is it the function of the shear pin to allow the pilot to overcome that inputting force and to, for lack of a better word, gain control of the flight control system?

A Yes. The assumption is that this spool is jammed solid which would lock up the cyclic stick and the shear pin that is located near the input to the valve would shear and allow the controls to move independently of the jammed valve.

Q However, I am not sure you are answering my question and maybe I should rephrase it a little better. Let me ask you to assume that the pilot valve and the Moog valve have been jammed in an open position one way or the other to a port allowing the hydraulic fluid to pressureize down, moving the power piston one way or the other, left or right, it doesn't matter.

Is it the shear pin's function to shear and allow the pilot to gain mechanical control of the flight control system under that type of circumstance?

A Normally he would switch to the other stage of the AFCS servo. By shearing this pin, this would give you normal control back.

Q Let me ask you, during the period of time that a (p. 26) pilot has not switched from one to number two, is it the function of the shear pin to shear and allow the pilot

to gain mechanical control again under the previous hypothetical that I am giving you?

A He could overcome the hardover force that he would have here, but he would be having to fight this stage until he switched over.

Q Do you mean that the shear pin, then, has no effect on the safety mechanism, so to speak, under the condition I am describing?

A No, I don't mean that.

Q Then what effect would the shear pin have under the conditions we were just describing?

A The shear pin would allow him to regain normal control with the other stage.

Q If he switches over to the other side?

A If he switches over.

Q But as long as he's on the stage that's jammed, then the shear pin would have no effect on his gaining control, is that correct?

A That's correct.

Q So, the only means as long as he stays on the jammed servo stage is for him to mechanically wrestle it back to wherever (p. 27) he wants the stick to be.

A That's correct.

Q Now, do you know what amount of force is required by the pilot to, given the hypothetical I am giving you where you have a jammed pilot valve in the moog

valve, what would be required by the pilot to wrestle the stick back, let's say, to neutral given the hardover?

A No, I don't know exact numbers. We have tested that exact condition to determine that it could be done, but I don't know the numbers.

Q When was this test performed?

A Within the past two years.

Q Was it as a result of this accident?

A It was.

Q Do you recall approximately how much force was required to overcome the hardover under the condition I've described?

A No, I don't. All I could give you would be an approximate number.

Q Well, did you participate in this test?

A No.

Q Was it something somebody told you or a report that you have seen?

(p. 28) A It was in a report I have seen.

Q Was this part of the post-accident investigative study?

A I think that it was. I am not positive of that.

* * *

(p. 29) Q And I think the force then to move against the hardover would be 55 pounds?

A Yes.

Q Do you know under what conditions this particular hardover was generated?

A No, I don't.

Q Do you know whether it was by blocked pilot valve or jammed pilot valve?

A (No response)

Q Perhaps if I ask you another question. Well, your answer is "No," you don't know?

A No, I don't know.

* * *

(p. 31) Q Mr. Sedlock's conclusions in the last page of Exhibit 17(d), number one, indicate maintenance and manual—strike that question.

His last paragraph, first paragraph of the last page indicates "Certain maintenance procedures may not have been followed subsequent to blade drop." Do you see that?

A Yes.

Q Do you know what Mr. Sedlock is referring to?

A Yes, I do.

Q What is he referring to please?

A He believes that the damage on the mixer could have been a result of a blade drop, also note six on page two of this same document.

I am sorry, it's the wrong note. Note five of page two of this document where he noted some brinelling in a ball bearing and he suspects that may have also been a result (p. 32) of blade drops.

Q What do you mean by "blade drops?"

A When they fold the blades on helicopters, we have what are called pitch locks that react to the load of the blade. Actually, it is a moment on the spindle. You can imagine when the blade drops ninety degrees to the spindle, it gives you a pretty good moment arm.

Pitch locks are normally engaged to react that low. If for some reason the pitch locks are not engaged, this load comes through the servos all the way back to whatever system stop is contacted first.

* * *

IN THE UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF VIRGINIA
RICHMOND DIVISION

DELBERT BOYLE, a personal
representative of the Heirs and
Estate of David A. Boyle, de-
ceased,

Plaintiffs,

vs.

No. 84-0486-R

UNITED TECHNOLOGIES
CORPORATION,

Defendants.

DEPOSITION OF TERENCE J. FOX

April 8, 1985

(p. 2) at Law, 221 Pine Street, Suite 500, San Francisco, California 94104, represented by LOUIS S. FRANECKE, Esquire, appeared as counsel on behalf of the plaintiffs.

Messrs. HUTTON & WILLIAMS, Attorneys at Law, 707 East Main Street, Richmond, Virginia 23212, represented by LEWIS T. BOOKER, Esquire, appeared as counsel on behalf of the defendants.

Also present: Sandra McLaughlin, Paralegal.

—oOo—

TERENCE J. FOX,

called as a witness by the plaintiffs, having been first duly sworn by the Notary Public to tell the truth, the whole truth, and nothing but the truth, testified as follows:

EXAMINATION BY MR. FRANECKE:

Mr. Franecke: Q. Would you state your full name, please?

A. Terence J. Fox.

Q. And what is your present address?

A. 361 East Hazelwood, Lemoore, California.

Q. And that is near Fresno, California?

A. Yes, it is.

Q. And what is your telephone number, do you know?

A. Area Code 209 924-7578.

Q. By whom are you present employed?

A. By Naval Air Rework Facility, North Island, with the field office at Lemoore.

Q. Where is North Island located?

A. San Diego, California.

(p. 3) Q. And what generally is your job title or your duties and responsibilities?

A. Engineering technician. Job responsibilities are logistics management for the FA-18 fighter aircraft.

Q. FAA?

A. FA-18 fighter.

Q. For the U.S. Navy?

A. Yes.

Q. Are you a civilian employee of the Navy or are you—What are you?

A. Civil employee of the Navy.

Q. How long have you been a civilian employee of the Navy?

A. Since October 1961 or November 1961.

Q. Have you always been involved in the engineering area for your employment with the Navy?

A. No. Since about 1970.

Q. What were you then prior to 1970, from '61 until '70?

A. I worked in the shipyard for two and a half years. I worked at the Naval Air Rework Facility from '64 to '70 in hydraulic fuel as a mechanic.

Q. Briefly what is your educational background?

A. It's three years of college and various trade schools.

Q. What subject did you study in college?

A. Primarily business.

Q. Did you have any military service?

A. Yes, three years in the Marine Corps.

Q. And what capacity?

A. Radio telegraph operator.

(p. 4) Q. This case that you're being deposed on involves a CH-53 helicopter, the hydraulics. Do you understand that?

A. Yes.

Q. Can you give me a general description of what your background has been in the area of hydraulics and servo systems pertaining to helicopters?

A. It's been approximately '67 or '68 when the CH-53 was first introduced to the fleet that I attended a servo cylinder and repair school, had training on the Moog servo controls, on the input valves, shop experience up until about 1970.

Q. Let me stop you there.

When you say shop experience until 1970 what kind of shop experience did you have?

A. Overhauling and testing of hydraulic components.

Q. And what do you mean by testing?

A. Evaluation, disassembly and reassembly.

Q. You took the servo cylinders apart and reassembled them?

A. Yes, I did.

Q. Were you a supervisor or were you an actual mechanic doing the actual work?

A. At that time I was a mechanic.

Q. Did you during this period of time up until about 1970, did you have occasion to disassemble and assemble CH-53 roll servocylinders?

A. Yes, I did.

Q. As well as I believe there's yaw and collective and pitch servocylinders; is that correct?

(p. 5) A. Yes.

Q. About how many of these servocylinders did you disassemble and reassemble, just a general idea?

A. Probably around 50.

. . .

(p. 7) Q. It was your understanding that the Navy which would include the Marine Corps had maintenance contracts with Sikorsky for periods of time?

A. Yes.

Q. And as those contracts would then terminate or run out then Pensacola would pick up the subsequent work?

A. Providing they have the capabilities.

Q. Do you know when the contract ran out with regard to the AFCS roll servocylinders?

Recognizing again, I draw your attention to what we know about this case, that there was work done in the first quarter of '82 by Sikorsky and in the fourth quarter by Pensacola.

A. I don't remember.

Q. Was it in that time frame?

A. I think it was prior to then. I don't remember for sure. I know for a period of time that both Sikorsky and Pensacola were doing the rework on the servos.

It was sort of a split of the workload.

Q. From about 1979 until 1984 were you involved in evaluations pertaining to binding, sticking, and racheting, referring to the roll AFCS servocylinder?

A. Yes, I was.

* * *

(p. 13) Mr. Franecke: Q. Now Mr. Fox, at some time in 1983, presumably April, you received word that there had been a crash of the CH-53D; is that correct?

A. That's correct.

Q. How many other accident investigations had you participated in prior to that time?

A. Probably about 30.

Q. How many?

A. About 30.

Q. And did these all involve 53-type helicopters or were there others?

A. There were also others, and then there was also fixed wing aircraft.

Q. How many of them involve 53-type helicopters?

A. Approximately 20.

Q. Did any of these 20 have problems having to do with the hydraulic systems that may have contributed to the crash?

A. None that I recall offhand.

Q. Did any of them have to do with imbalances having to do with fuel transfers from the auxiliaries to the main tanks?

A. One did, yes.

Q. When you say 20 crashes had to do with 53-type helicopters, I'm using the whole general spectrum, is it true that none of those involved anything having to do with hydraulics?

A. Right now to the best of my recollection none had directly to do with hydraulics.

(p. 14) Q. Do you remember about what date you actually got word that there had been a CH-53D crash that's involved in this litigation.

The accident took place—

A. June 27th—I was just looking—

Q. That's all right. You may refer to your notes.

You do have some of your notes with you?

A. Yes. Probably the 28th of April.

Q. Do you remember what you first did?

A. We've requested to furnish technical and metallurgical expertise at the site where the aircraft was recovered and brought to.

Q. And were you to furnish this technical and metallurgical expertise?

A. The squadron requested assistance.

Q. When you say the squadron you mean the squadron whose aircraft had crashed?

A. Yes.

Q. Had you received any request for technical assistance from any form of marine investigative board at that point?

A. Yes. It would have been the investigative board for HMH 461.

Q. Now, there's a JAG board also, is that correct, as far as you know?

A. There were two investigations. This was the Mishap Board that requested it.

Q. Who I believe was headed by a Major Miller; is that right?

(p. 15) A. Yes.

Q. Essentially what were you supposed to be doing, look at the aircraft and do whatever investigations as necessary?

A. Look at the aircraft in its condition as recovered from the water.

The primary function was to look at the flight controls completely from the sticks all the way up to the rotor head, report on any damage that was done to it, and look for anything that could have caused a malfunction.

Q. Was it part of your responsibility to interview any of the flight crew or other witnesses to the actual crash?

A. No, it wasn't.

Q. Did you do that in any way, either formally or informally?

A. Informally I was allowed to talk to the pilot along with John Combs from the Naval Safety Center.

Q. Mr. Combs was present?

A. Mr. Combs was present. He was doing the primary interrogation.

Q. Do you know whether or not he took a statement, something written or recorded?

A. At that time, no. The actual interrogation of any of the people involved with the aircraft was done by the flight surgeon.

Q. Do you recall what the pilot indicated as to what happened?

A. No, sir. At the time we talked to him he felt that when he took control that he either had a hard over or the (p. 16) stick drove to the right.

Q. Anything else that would be significant to you as far as your investigation is concerned other than that?

A. No, sir. To the best of his recollection he said that he did not notice any problems with any other channel in the flight control as far as pitch or yaw or collective.

Q. Do you recall whether or not you talked with the pilot before or after you started your investigation of the actual physical wreckage itself?

A. When I talked to the pilot was after we had begun our depo investigation of the various components.

Q. That was done at Pensacola?

A. We were at Pensacola and talked to them on the phone.

Q. So that was after you had removed various items from the wreckage?

A. Correct.

Q. Let's go back then to I think it was Norfolk that the wreckage was taken to?

A. Yes, it was.

Q. What did you do in general when you went to Norfolk to take a look at the wreckage?

A. First thing we did was check the position of the various flight controls, stick position, pedal position, check the positions of the AFCS servocylinders and primary servocylinders to assure that they coincided with stick positions.

We went completely through all the torque tubes in the flight controls to assure that all of them were intact. There was no evidence of any bell crank having a foreign (p. 17) object in it that could have bumped it or anything in the linkage of the servos themselves.

Due to the condition of the rotor head we disconnected the primary servocylinders and checked the rigging of the flight controls back up to the stick.

Q. Anything you found on this there?

A. The only thing that was amiss was the fact that the copilot's cyclic stick was approximately two inches to the left of center.

Q. And what is the total throw, if you will, of the copilot's stick from center position to the full left if you know?

A. As I recall it was about six inches or should be approximately six inches.

Q. Or more?

A. No, it would be less.

Q. The total throw is 15, 16 inches?

A. Something like that.

Q. So we know we're talking about the right thing, I show you exhibits that have been marked Plaintiffs' Exhibits 2-A through -E from previous depositions and ask you if those are photographs of the wreckage of the aircraft that you examined?

A. Yes, it is.

Q. Did you examine the tail rotor assemblies, so to speak, if there had been any failure in the mounting feet or any other part of that assembly?

A. Both myself and an individual named Eli Nicosia who (p. 18) is a metallurgist from Pensacola looked at the feet. In addition to their squadron personnel and John Combs.

Q. And did you determine whether or not there had been any failure in the tail rotor that may have contributed to the accident?

A. There was no apparent failure that would have contributed to the accident, no.

* * *

Q. Did you check the electrical system of the aircraft to see if there was any contributing cause?

A. There was an electrician that did go up to the aircraft and yank out some wires to determine if there were any electrical failures.

He did not see anything that was indicative of an electrical failure.

Q. Eventually your investigation I believe started honing in on the various parts of the hydraulic system; is that correct?

A. That's correct.

Q. What did you do with regard to your initial investigation of the hydraulic system?

A. We removed selected components: the primary (p. 19) servocylinders, the tail rotor servocylinder, the AFCS servocylinders, the reservoir, the filter manifolds, and a few of the shut-off valves that pertained to the servo systems. And they were checked and they were shipped back to Pensacola where we performed some functional tests of the units and a teardown and examination.

Q. Before removing these particular items did you examine the various hydraulic lines themselves at the top of the record here shown in Exhibit 2-D?

A. Yes, I did.

Q. And were all of these lines, hydraulic lines intact or were there breaks and openings in them?

A. Some of them had breaks and openings.

Q. Do you remember as you sit here now what lines had breaks and openings and which didn't?

A. To the best of my memory the majority of them were on the upper portion of the hydraulic compartment and lines that were aft of the main gear box and rotor head.

Q. Was it your understanding that the aircraft when it finally rested on the bottom of the sea was in an inverted position?

* * *

(p. 20) Q. Did you take anything apart other than the various servos, et cetera, off of the aircraft while you were at Norfolk?

A. No, we just removed the components as they were.

Q. When you say you removed the components I know you probably had a mechanic do it; is that right?

A. That's correct.

Q. Or maybe yourselves, too.

Were the lines for the various servos, were they plugged in any fashion for transport down to Pensacola?

A. Yes, they were.

Q. And that was after they were removed?

A. Right.

Q. Who was in charge, so to speak, of the hydraulic system investigation when you removed the various components for transport down to Pensacola?

A. Myself.

Q. You were in charge, okay.

A. Well, let's put it this way: I was in charge as far as what I wanted to remove. Of course, the military is going to be in charge of themselves.

But I was present to make sure things were done the way I wanted.

Q. Was there a Mr. Combs also involved in this investigation at that point?

A. Yes, he was.

Q. Was he in charge of some different investigation or were you working together or what?

(p. 21) A. Mr. Combs is from the Naval Safety Center, and he is in charge of the overall investigation both from the standpoint of what the squadron does for their Mishap Board and in addition what I do as far as the components from a depo standpoint.

Q. He was overall in charge, but your responsibility was the hydraulics?

A. Yes, sir.

Q. Prior to leaving for Norfolk did you also take a look at the fuel system of the aircraft as much as there was in the wreckage?

A. As much as there was. I did, yes.

(Discussion off the record.)

(Whereupon, three photographs were marked as Plaintiffs' Exhibits 75-A, -B and -C respectively for identification.)

Mr. Franecke: Q. Off the record I've had three photographs which have been marked Plaintiffs' Exhibits 75-A, -B and -C, and I ask you, Mr. Fox, if you can tell me what these various photographs show.

A. Exhibit 75-B and -C show the fuel transfer valves on the port and starboard side of the aircraft.

Q. Can you tell by looking at those whether or not the transfer valves are open or in the closed position?

A. By looking at the photos it would be in the closed position.

Q. These are the transfer valves that would be utilized to transfer fuel from the auxiliary tanks into the main tanks?

(p. 22) A. That's correct.

Q. What does 75-A show?

A. 75-A is the fuel control panel that's located in the center console between the pilot and the copilot.

Q. And it appears that it's been removed from the panel in the aircraft; is that correct?

A. That's correct.

Q. Then does it show what positions the fuel transfer switches are in?

A. Yes, it does.

Q. What position do they appear to be in?

A. The left aux and main showing off position, and the right is showing fill position.

Q. One of them is broken off, is it not?

A. The upper left one is broken off, yes.

Q. Would that be the—

A. That would be for the aux.

Q. Would that be for the left or right tanks?

A. For the right aux tank.

Q. Is broken?

A. Yes.

Q. Do you recall when you first examined the aircraft in what position the various switches were in?

A. I recall the one being broken. I don't recall the exact position, no.

Q. Was there any indication to you while you did your investigation that there may have been a fuel center of gravity imbalance that may have contributed to the crash (p. 23) itself?

A. No, there wasn't.

Q. Now you took these various pieces of the aircraft, servocylinders, et cetera, down to Pensacola.

What did you do down there with them?

A. The first thing we did to all the components was to flush them to remove all the contaminants. We use cheesecloth to collect anything coming out.

Our main concern was to get any obvious contaminants, collect them, and also to purge any salt water from the units prior to functionally testing them.

Q. Is it possible to check the freedom of movement of these roll servocylinders by hand prior to putting them on a test bench?

A. Yes, it is.

Q. Was that done before you did any flushing or purging of the salt water at any time?

A. Yes, it is.

Q. Do you know whether it was done?

A. Yes, it was.

Q. And honing in on the visual, was any binding or sticking or anything else noticed by your hand examination as to what may have been going on?

A. There was nothing noted, no.

Q. Then everything was flushed and purged?

A. Correct.

Q. Was this with the screens on or off while the purging was done?

(p. 24) A. Screens?

Q. The filter, I'm sorry, the filters on the servocylinders.

A. The filters on the servocylinders were still intact.

Q. Was anything noted in the flushing process as to what may have come out of the servocylinders?

A. I'd have to look in here.

Q. Sure. Let me show you something, Mr. Fox.

Let me show you Plaintiffs' Exhibit 1 which is the Major Keown Jag Investigative report and show you one of the last enclosures which is enclosure 36, I believe, and ask if this is your report pertaining to your investigative findings down in Pensacola of the various components of the crashed aircraft.

A. Yes, it is.

Q. Now you were just saying you had to check your notes.

Were you referring to that message report?

A. Yes, I was.

Q. You can use your copy of that. It's the same.

A. Okay.

Q. What were your findings with regard to the flushing or purging of the roll AFCS servocylinder as to any contaminants?

A. Okay. The contaminants from the first and second stages of the roll AFCS servocylinder were aluminum slivers, sand, and carbon, and it was in excess of Class 5 hydraulic system.

Q. Was this collected in the filters or was this gotten (p. 25) out of the filters?

A. It was taken directly from the return port on the cylinder itself.

Q. When it's taken from the return port has it gone through a filter yet?

A. No, it would not.

Q. So it would just be coming out of the free servo mechanism?

A. That's correct.

Q. Was any of the hydraulic lines that were open on the ocean when the aircraft was in the water, were they connected to the roll servocylinder as you recall?

A. Yes, it would have been because there's one line that is common to all the servocylinders.

In some servocylinders we found more water contents than others.

Q. That was water, sea water throughout the system?

A. Yes, sir.

Q. Would that account then for the sand—

Mr. Booker: Object to the form of the question.

Mr. Franecke: I didn't finish my question.

Q. Would that account for the sand that was found in the roll servocylinder?

A. It is possible, yes.

Q. Do you have any opinion as to the source of the aluminum slivers that you found in the roll servocylinder?

A. I would have to assume it came from the housing of the servocylinder itself.

(p. 26) I did not make a statement.

Q. And what about the carbon?

A. The carbon was probably, it was most probably from the normal deterioration on the package in the servo.

Q. Did you at any time then also examine the filter, the incoming filter to see what was on that of the roll AFCS servocylinder?

A. It would have been the same findings I had on the hydraulic system.

Excuse me, I neglected to mention one thing. There is also ferrous material from those hydraulic systems.

Q. You mean iron or steel?

A. Iron or steel, yes.

Q. Was it determined as to what that was?

A. No, it wasn't.

Q. Was it determined where it came from?

A. No.

Q. I think I asked you did you examine the incoming filter on the roll AFCS servocylinder.

A. It would have been part of the system filter. Yes, I did.

Q. Do you recall what was found on the incoming roll servocylinder?

A. Hydraulic samples from the second stage pressure manifold contains ferrous material, aluminum, and carbon.

Q. Is that the incoming filter for the first stage?

A. Second stage hydraulic system, first stage AFCS servo system.

(p. 27) So that would be the incoming filter, yes.

Q. Anything else found in the incoming filter?

A. No.

Q. You had also examined the exterior of the roll AFCS servocylinder, and you found that there was a manufacturing date of first quarter 1982.

A. That's correct.

Q. And who did the manufacturing?

A. Sikorsky Aircraft.

Q. Serial number of the servocylinder was what?

A. 363.

Q. Did you make note of the serial numbers of the various Moog valves that were on the roll servocylinder?

A. No, I did not.

Q. You disassembled the servocylinder; is that correct?

A. That's correct.

Q. Was this disassembled in your presence or did you presently do the work?

A. It was disassembled in my presence.

Q. Did you find anything in the servocylinder housing that would appear to have contributed to the accident? I'm not talking about the Moog valve, I'm talking about the servocylinder assembly.

A. No, I did not.

Q. Was there anything in any of the power pistons or any of the other slides or O rings that would indicate to you that there may have been some contribution to the accident?

A. The servocylinder itself, no.

(p. 28) Q. Now during that period of time were employees or representatives of Sikorsky present during the disassembly and testing process?

A. Yes. Tom Conway from their safety department. Jesse Clemens, he's a hydraulic and flight controls engineer. And there was one other person from their hydraulic and flight control engineering, and I don't recall his name.

Q. Was it Ed Sedlock?

A. Sedlock, yes, he was present.

Q. I believe they left prior to the disassembly of the first stage Moog valve; is that correct?

A. That's my recollection, yes.

Q. Prior to their leaving did they offer you any explanation as to why the accident took place?

A. No, they did not.

Q. Did you ask them?

A. Yes.

Q. And did they say they didn't have any explanation or they just didn't know?

A. At this time they said they didn't have any explanation.

Q. Did they offer you any explanation with regard to a fuel transfer center or gravity imbalance?

A. While we were at the Norfolk site it was discussed at that time, and it was pretty much disproved as a possibility.

Q. This is what they said at this point to you?

A. They felt it was, yes. They felt the damage to the switch and the position, the switch could have been kicked during egress from the aircraft.

(p. 29) Q. By the pilot?

A. By the pilot or copilot.

Q. Now at some time then after Sikorsky left the Moog valves were taken apart; is that correct?

A. It was either the same day they left or the following morning.

Q. Who took the Moog valve apart?

A. It was a mechanic from the hydraulic shop.

Q. Were you present while it was being done?

A. Yes, I was.

Q. What happened, what did you find?

A. When examining the slide and spool they found a piece of distorted wire that was approximately a tenth of an inch long.

I originally reported it as being approximately 15 thousandths of an inch in diameter.

On further examination under the electron beam microscope I determined it would be closer to 2 to 5 ten-thousandths of an inch thick and approximately 15 thousandths of an inch across and approximately a tenth of an inch long.

Q. What would the diameter be?

A. It would have been a distorted 15 thousandths.

Q. And how long?

A. Approximately a tenth of an inch long.

Q. Let me refer to the last page of Exhibit 1 which I believe to be a schematic drawing of the AFCS servo-cylinder.

A. Yes.

(p. 30) Q. Can you take that pen if you would and circle or make an X as to where the piece of metal that you just described was found in the first stage servo valve?

A. To the best of my recollection it was in this area.

Q. Would you circle that and make your initials?

I want to see this a second. You have indicated a place that was at about the slide of the pilot valve.

A. That's correct.

* * *

Q. Did you conclude anything then with regard to the finding of this piece of metal in the ports of the pilot valve of the first stage Moog valve with regard to its contribution to the accident?

A. Just concluded its position and the fact it had a sharp indentation at one end and was bent, that it could have jammed his slide on the pilot valve and caused the hardover.

Q. If the pilot slide had been jammed what would be the result?

A. The stick would have driven until it reached its stop.

Q. One way or the other?

A. Correct.

(p. 31) Q. Now based on that conclusion, or let's say at that point a hypothesis, was further work done to determine what type of metal was involved in this piece of metal that was found in the—

A. Yes, it was turned over to a metallurgist and he determined it to be a composition similar to QQ-W-461 wire, which is a 1010 steel.

Q. Was it determined what hardness this particular piece of metal had?

A. Not to my recollection, no.

Q. Who was the metallurgist that did this, or if I put it a different way, what was done at Pensacola or was it done somewhere else?

A. It was an examination done in Pensacola. That's who I got my source as to composition of the wire. John Combs from the Naval Safety Center took that piece of wire and the spool and sleeve from the servo valve, and he told me that he had it examined at the FBI laboratory in

Washington, D.C., and he also I believe took it up to Sikorsky Aircraft.

Q. And did Mr. Combs tell you the result of his various investigations?

A. No, sir, outside of the actual cross-section in the narrower direction was—I forget exactly, but it was between two and five ten thousandths of an inch.

Q. Like it had been flattened out?

A. Like it had been flattened out, yes.

Q. When the metal was found in the servo was it jammed into the—was it a spool or what's referred to as a pilot (p. 32) valve?

A. No, it was found in between the two glands on the spool, of the sleeve and spool, which is referred to as a pilot valve.

Q. Did Mr. Combs ever tell you at all what the results were of his work with either the FBI lab or Sikorsky other than as you just mentioned?

A. No, it just confirmed that that was the type of material it was.

Q. Did you find any other indications in any of the other servos that might indicate a contribution to the accident?

A. No, I did not.

Q. Did you ever attempt to determine the source of the piece of wire, QQ-W-461?

A. The source of the wire?

Q. Yes, where it came from, how it got into the Moog valve?

A. No, sir. It would have to have been present in the valve or the servocylinder for a period of time.

Q. Do you know whether or not anything was done at Pensacola to determine whether or not that type of wire was utilized in any other activities pertaining to servocylinders?

A. Yes, there was a quality audit run on the hydraulic shops, and the findings of that audit was that that particular type of wire was not used at all in the shop.

Mr. Franecke: Madam Reporter, will you mark this?

(Whereupon, a three-page document referred to as the results of the quality audit performed by Pensacola on the hydraulic shop (p. 33) was marked as Plaintiff's Exhibit 11 for identification.)

Mr. Franecke: Q. Mr. Fox, I'm going to show you a copy of a three-page document that has been marked as Exhibit 11, and ignoring the first page which is merely a transmittal letter, do you recognize the message that is represented on the second and third page?

A. Yes, it is the results of the quality audit that was performed by Pensacola on the hydraulic shop.

Q. And what is your understanding of the result of the audit that was done at Pensacola?

A. That that particular type of wire is not used. There was none present in the hydraulic shops at Pensacola.

Q. And would this be during a period of time say 1982 through 1983?

A. Correct.

Q. Did you do any further work with regard to your investigative process pertaining to establishing the probable cause of the accident involved in this particular case other than up to the point that we've talked to you now?

A. No, sir, just further investigation of the other various components to make sure none of them contributed to the mishap.

* * *

(p. 35) Q. How long did the investigation at Norfolk last approximately?

A. Approximately two and a half days to three days.

Q. How long did it last in Pensacola while someone from Sikorski was present?

A. To the best of my recollection three days of actual (p. 36) investigative work.

Q. Do you know why the Sikorski representatives left before you opened up the Moog valves?

A. No, sir, I think they may have based the opinion that nothing was going to be found based on the results of the functional tests of the servos and what they had observed so far.

Q. When did you make the decision to open up the Moog valves?

A. The decision was made right from the very beginning that everything was going to be gone through. The

priority of things being taken apart, that just happened to fall into that time.

Q. Did Mr. Combs actually participate in the breakdown of any of the parts?

A. Participate, you mean observe?

Q. Yes.

A. He was there for almost all the disassembly.

Q. Do you know what his background is?

A. He's been a mishap investigator for the Naval Safety Center for quite a few years. He's an XH-3 pilot with the Navy.

Q. Do you know whether he has the experience in actual hands-on working with hydraulic systems that you do?

A. He does not have as much, I don't believe. He has been present during numerous disassembling and evaluation of hydraulic components off of a mishap aircraft.

Q. Was a Mr. Lowrey present?

(p. 37) A. I don't recall him being present, no.

Q. Do you know anyone by that name?

A. Yes, I do.

Q. Who is he?

A. He's an engineer at Pensacola in the H-53 engineering group.

Q. Who else from the Navy participated other than the people you've already named?

A. Eli Nicosia, a metallurgist, and there were two other metallurgists involved. I could not recall their names.

Q. Did Mr. Nicosia do the examination on the piece of wire or whatever it was that was found in the Moog valve?

A. No, sir.

Q. How long had you been familiar with servos of this kind?

A. Since either 1968 or 1969 when I attended a Sikorsky service school for the overhaul of AFCS servos and primary servos.

Q. Where was that school?

A. It was given by Sikorski at North Island.

Q. Was it that same kind of servo which you studied back in '68 or '69 which was in use on the accident aircraft?

A. The same type. There's a few minor modifications to improve the servo.

Q. Has that kind of servo been used in helicopters ever since you've been dealing with helicopters?

A. That type or a similar type.

Q. And is a servo a standard part that you'd expect to find (p. 38) on most at least big helicopters?

A. Yes.

Q. Between 1967 and 1983 were any of the modifications other than minor ones?

A. There was some modifications to the trim piston and to the power piston to use a different type of seal.

Q. Can you recall any other modifications?

A. There was a modification to the sensor bracket to increase its strength. There was a change to the trim valve

from Bendix-manufactured one to a Moog-manufactured one. There was an addition of a redundant link to the dual input servo valve to eliminate a catastrophic failure in the event that the primary link failed. And that's about it.

Q. When those modifications were incorporated into the system were all helicopters supplied with the modified servos or was that just something that happened over a period of time when they were in for routine overhaul?

A. The redundant link was a direct retrofit that was done by squadron personnel on any of them going through rework at depo.

The changes to the power piston and trim piston was an attrition type of change as it would go through the depo.

Q. Was there any expected lifetime for a roll AFCS servo before it would have to be replaced or overhauled?

A. Originally it was 300 hours and it was increased to a thousand hours, and then the established time to overhaul it or repair it was abolished. It was put on what is called "upon condition."

(p. 39) Q. What does that mean?

A. It basically means fly it until it fails due to normally hydraulic leakages.

Q. Is it understood they all fail sooner or later from hydraulic leakage?

A. The majority will, yes.

Q. And how do you determine that one is approaching its fail?

A. During daily inspections on the aircraft that the crew chief or whoever the mechanic is is supposed to ob-

serve all these hydraulic components actuators to check for things like linkage or leakage or anything that appears to be distorted.

Q. Is he instructed to pull one off before it fails or to wait until it fails and then replace it?

A. If it's leakage it's going to be a slow failure. He will note it and it will be replaced before it was a catastrophic failure.

Q. What is the difference between a slow failure and a catastrophic failure?

A. There is a criteria of how much leakage you are allowed given an overnight standing of the aircraft or in so many cycles of a piston that they're allowed one drop of leakage.

Once it exceeds this set standard the component is to be removed.

Q. Is this something the crew chief is supposed to check in these daily checks you described to us?

(p. 40) A. Daily checks and turnarounds.

Q. What is a turnaround?

A. Come in, shut down the aircraft prior to its going out on the next flight.

Q. Assuming an aircraft landed two or three times a day it might be checked as often as two or three times?

A. That's correct.

. . .

Mr. Booker: Q. And what type of maintenance did (p. 41) your examination of the servo reveal had apparently been done to it by the Navy at Pensacola?

A. It would have been probably repaired with a large quantity of servos coming in that had been identified as having problems with binding or ratcheting, and it would have been a limited work done to it in the power piston or trim piston area.

Q. Do you have any records other than whatever decal was on the servo itself to indicate what work was done on it at Pensacola?

A. I do not have any other records. Pensacola keeps records for a certain period of time on anything that goes to rework. It's my understanding these are past that period of time that they keep records.

Q. Did you at the time of the accident make any attempt to find out what the history of the rework at Pensacola in the fourth quarter of 1982 had been?

A. No, sir. I went on the assumption it was repaired in the short period of time between the indicated manufacture date and the time it was reworked, then it would have been either a binding power piston or trim piston.

Q. But that was an assumption on your part; is that correct?

A. This is an assumption, yes.

Q. And you did not check any records at Pensacola either to verify or correct that assumption?

A. I didn't.

Q. And you don't recall what color decal there was on the (p. 42) servo?

A. I'm basing it strictly on the short period of time between the manufacturer's date and the rework date at Pensacola and what was standard procedures at this time and still is as far as I know, which is to do a repair rather than a complete overhaul.

Q. But if in fact there had been something wrong, major wrong even in that short interval of time it could have been overhauled, could it not?

A. It would have had to have been, yes.

Q. But had that happened it would have been overhauled and would have had the overall sticker on it rather than repaired; is that correct?

A. That's correct.

Q. When it was repaired what seals were replaced?

A. It would have been the seals on the trim piston and power piston.

Q. How does one go about replacing them?

A. There is a jam nut at the end of the piston that is removed, and the piston and the sleeve is pulled from the body on the servocylinder.

Q. And where is that piston in relation to the Moog valve?

A. The power piston is located approximately one inch, inch and a half below the Moog valve. The trim piston is approximately two and a half to three inches below the Moog valve.

Q. And is the Moog valve removed although not disassembled (p. 43) in the course of doing that?

A. No, it is not.

Q. It's left in position?

A. Yes, it is.

Q. When a servo is overhauled is the Moog valve removed?

A. Yes, it is.

Q. Is the Moog valve disassembled?

A. It would depend on the date in most cases—start over again.

It would depend on how long it has been in service. If it's been a short period of time it would have been tested and put back on the unit. If it had been in service for a long period of time then it would have been resealed internally and readjusted and put back in service.

Q. If a Moog valve is found defective what does the Navy do at a rework facility?

A. They do basically what would be considered a complete overhaul. They would disassemble it completely, do a visual examination on the bushing and spool, replace the filters, check continuity on the coils, repack it and readjust it.

Q. In the event the Moog valve were not repairable what would the rework facility do?

A. If it was not repairable it would be condemned and it would go out of service altogether.

Q. The whole servo or just the Moog valve?

A. Just the Moog valve.

Q. Rather than put the whole servo out of operation what would you do?

(p. 44) A. Replace it with a new Moog valve.

Q. Does the Navy procure them directly from Moog?

A. I do not know for sure on that. I assume they do through the aviation supply office.

Q. In any event there are individual Moog valves available at the rework facility in the event one is condemned and it is necessary to put a new one on a servo to make the servo operable?

A. That's correct.

Q. Did you make any check of the history of the Moog valves on this particular servo?

A. To the best of my recollection there was no indication it had ever been removed from the servo.

Q. But that's on the assumption that this was manufactured new in 1982; is that correct?

A. To the best of my recollection there was also some yellow torque paint on the bitter ends of the safety wire. This is normally used by Sikorsky.

Q. What is that?

A. It's a seal, tamper seal. And if the squadron removed the valve or if people at NARF had removed the valve for any reason this paint would be disturbed.

Q. When you took the roll servo off in Norfolk did you attempt to operate it manually there?

A. I don't recall.

Wait a minute. Prior to it being removed from the aircraft, in the course of collecting the rigging on the aircraft and also to check freedom of movement in the controls (p. 45) the pistons were displaced at this time.

Q. Did they move freely?

A. Yes, they did.

Q. So at least by the time you began to work on it there was no remaining hardover; is that correct?

A. No, there was not.

Q. And did you apply power to the servo at Norfolk?

A. No, we did not.

Q. Why did you not do that?

A. Because the number of lines that were broken, we also had the requirement we would have to have electrical power on the aircraft, and there was too many broken and frayed wires that we would end up doing damage.

Q. Did anyone at Sikorsky ask you to apply power to it at Norfolk?

A. We had talked about it at first until we looked a little closer at what the consequences would have been had we applied power.

Q. When you got it back to Pensacola and had it on the bench did you first attempt to manipulate it manually?

A. Prior to putting it on the bench we manipulated it manually. It got to be standard procedure because of problems we were having with the binding.

Q. And did it function properly then?

A. It appeared to, yes.

Q. When you put it under power did it appear to function properly?

A. Yes, it did.

(p. 46) Q. And so at that point there was nothing about that particular servo to make it suspect, was there?

A. At that point, no.

Q. And it was not until you opened the Moog valve later on that you discovered the chip that made you suspect that servo?

A. That's correct.

Q. You mentioned that it was determined, that the chip was found to be a particular kind of metal, and that was based on a report you got from Mr. Combs?

A. It was based on the report I got from metallurgists at Pensacola.

Q. And you yourself did not make that analysis?

A. No, sir. I'm not a metallurgist.

Q. And do you know who did make that analysis?

A. The name is starting to come back. I believe it was Swann.

Q. Swann?

A. I believe that was his name.

Q. And do you know how he went about making that analysis?

A. He put it on a standing electron beam microscope.

Q. Did you speak to him personally or did you read a report he wrote?

A. I spoke to him personally.

Q. Did he tell you it was this kind of wire or it appeared to be this kind of wire?

A. He told me it was similar in composition.

(p. 47) Basically what he did, during his analysis, I don't know exactly how it works, but he figures out the components or composition of the wire itself. Then he goes through his handbooks, and it says, "Similar to 1010 wire."

And also he went a little further, "Similar to this military specification for QQ-W-461 wire."

* * *

Q. You've described other contaminants which were found throughout the system in your report, have you not?

A. Yes, I have.

Q. And you have speculated that the sand found might have come from surface sand on the bottom of the ocean?

A. Some of it might have been. It is fairly common to find sand in the hydraulic system in a helicopter. This is due to the operational environment.

Q. The sand might have come from the operation as well as from the bottom of the ocean, is that correct?

A. That's correct.

Q. And what about the carbon, I believe you said that came from a breakdown of the seals?

A. That's correct.

Q. And that's something you find?

(p. 48) A. This is common in hydraulic components.

Q. What about the slivers of aluminum?

A. The slivers of aluminum would have come from the sleeves or the housing inside of the servo itself. This happens frequently if there are slivers on assembly of the slides into the housing, that it will pick up little minute pieces of contaminant.

Q. And weren't most of the servos which you examined found to have contaminants in excess of Class 5?

A. That's correct.

Q. And what is the allowable tolerance for contaminants?

A. Class 5 on aircraft.

Q. That's the max?

A. That's the maximum allowable limit.

Q. These were in excess of that?

A. These were in excess, yes.

* * *

Mr. Booker: Q. Is there no periodic check of the (p. 49) hydraulic system on a helicopter to determine whether it's contaminated?

A. On CH-53A and -D the only time they're required to check hydraulic samples is on the removal and installation of a component.

Q. And that might be every thousand hours?

A. It's possible.

Q. How is the hydraulic system on 53D charged?

A. Serviced, do you mean?

Q. Yes.

A. Either with a ground support cart which applies pressure to a quick disconnect on the bulkheads up by the hydraulic compartment, or by what is referred to as a pig which is a hand pump where they take it directly out of a can and fill up the hydraulic unit.

Q. Are the hydraulic fluids on the pigs and on the other service carts supposed to be checked at any interval?

A. They're supposed to be checked daily, and they are held to a Class 3 hydraulic system.

Q. And if they're above Class 3?

A. The filters in the cart have to be replaced and the cart has to be flushed until it's back within specifications.

Q. Did you make an examination as a part of your evaluation to determine whether in fact the hydraulic carts which were used to service this aircraft had been checked?

A. No, I did not.

* * *

(p. 50) Q. Did anyone ever tell you that in fact the carts had not been checked for three or four days before this particular accident?

A. No one had told me that, no.

Q. And if that's the case is today the first time you've ever heard it?

A. Today would have been the first time, yes.

Q. And would that have been anything significant to you?

A. I would have questioned what their findings were when they did check the carts if it was within allowable limits or not.

Q. Why is there a concern to check these carts every day?

A. Well, in the servicing of the aircraft you hook up to both a pressure and a return. So you're actually exchanging fluids between the cart and the aircraft, or there is an exchange. And to prevent contamination of another aircraft, it has to be checked prior to use.

Q. Why is there a concern about contaminants?

A. Deterioration of the hydraulic components, possibilities of findings of servo valves.

Q. Is that emphasized throughout the Navy and the Marine (p. 51) Corps so far as you know?

A. Yes, it is.

The hydraulic or aviation hydraulic manual makes a big issue of it. Generally in your general information por-

tion of your aircraft manuals they will make bold face type reference to the importance of it.

Q. And why is it regarded as so important?

A. Failure of hydraulic components.

Q. Did it ever come to your attention that Sikorsky disagreed with your conclusion as to the cause of the jamming?

A. Yes, it did. Mr. Carl Waleschek from Sikorski called me and said they had made some in-house testing by modifying a Moog valve where they could insert wire directly into the sleeve and spool, and that the results of their findings were that there was negligible increase in force necessary to operate the servo, and the wire sheared immediately. And to the best of my recollection this was a 10 or 12 thousandths safety wire.

Q. How did that differ from the wire here?

A. It's a harder wire. It's larger in diameter. Because of the distortion on the piece that I found in the valve.

* * *

Q. Somehow or another the wire had freed itself from a jammed position, had it not?

(p. 52) A. Yes, it did.

Q. And had the wire remained on the lands as you found it, the valve would function perfectly normally, would it not?

A. I found it between the lands. And if it stayed in that area, yes, it would function normally.

Q. Was it necessary for you to bypass the valve in any way to demonstrate how it could jam or to slide the valve over center in any way?

A. Are you talking about the suspect valve or the suspect servo?

Q. Yes.

A. We did not change any adjustments that were on the servo.

* * *

(p. 53) Q. Was there a shear pin in the roll servo?

A. Yes, there is.

Q. Did you look at it?

(p. 54) A. Yes. Or we checked that it was in one piece, let me put it that way.

Q. Apparently it had not been sheared?

A. It had not been sheared.

Q. Did you test it in any way other than to simply examine it?

A. We also checked to insure it did shear with the correct force.

Q. And it did?

A. Yes, it did.

Q. Do you know what happened to that particular servo, the one that was on the aircraft?

A. The one that was on the aircraft, we put all the components that came off the aircraft into a holding area

at Pensacola. Prior to the time that I transferred from Pensacola to NARF it was still in that area.

Normal procedure is that the squadron comes in releasing the wreckage and normally the parts are destroyed.

Q. With the parts still in the holding area when you left Pensacola?

A. To the best of my knowledge they were.

Q. When were you reassigned to North Island?

A. It was in August of '83.

* * *

(p. 55) Q. What is the total length of travel, if you know, of the piston in a Moog valve?

A. It's probably about four thousandths of an inch, somewhere in that area, five thousandths. Well, normal operation.

It can actually move further than that. 100 one-thousandths is the actual movement, full movement. One tenth of a total movement.

Actual operational movement is probably, one extreme to the other, maybe ten, twelve thousandths of an inch.

Q. On a range of sensitivity of aircraft parts how would you rate the Moog valve?

A. Very sensitive.

Q. In addition to the joint message form which I believe you have before you and the report we've already looked at did you make any other report?

A. Not to my recollection, no.

Q. Are you required to maintain your notes for any particular period of time?

A. There's no requirement, no.

(p. 56) Q. Are those all the notes you have?

A. Those are the ones that came from our electronic and electrical people of the examination that they did on the electronic parts and also instruments.

Q. Plus the overall report?

A. I don't believe I have any of my own notes in there.

Q. Do you have someone in your chain of command to whom you gave that report?

A. They go to my immediate supervisor, and actually go to about three to four people.

Q. Who is your immediate supervisor?

A. An individual named Charles Page, and then to B. T. DeArmon, and then it would have gone to Jim Ruff who was the Chief Engineer. And the fact that this had to do with a mishap, at that time there was a Commander Hoxie who was the Engineering Officer, and he would also have reviewed it.

Q. These were all at Pensacola?

A. All at Pensacola.

Q. Did any of them raise any questions about your report?

A. No, they didn't.

Q. Did any of them suggest you make any further examination?

A. Not at that time, no.

Q. Did they at any time?

A. No, none of them did.

* * *

(p. 57) Q. Do you have any estimate as to how fast the servo piston would travel with a hardover?

A. It would have reached a stop within a second.

Q. And if it were to, would you expect that to be a violent maneuver in the aircraft or gentle maneuver or how would you (p. 58) describe it?

A. I would think violent.

Q. How would that affect the control or the direction of the aircraft in a roll servo?

A. Well, the particular driving to the right such as the pilot claiming it did, it would make it roll right.

Q. Did you make any estimate as to how long it would take for it to roll to 90 degrees?

A. No, I couldn't because it was just your overall forces in the aircraft that may have driven floor because you would have had pressures against the servo.

* * *

Q. Let's see whether we can find what I'm looking at on my report on yours. You note that the copilot cyclic stick was approximately two inches of neutral.

Did that concern you at all?

A. Yes, it did.

Q. What was your concern about that?

A. Why it was that way, number one. And it would effect (p. 59) left lateral movement of the aircraft because it was over that way.

Not necessarily restrict it from going its full authority, but the copilot's leg would have been in the way.

Q. And you mention that you felt the travel either way would be about six inches.

Would it surprise you to learn that the travel is 4.43 inches?

A. No, it wouldn't. I've been away from it for a while, forgotten some of the exact figures.

Q. Did you look at the bids on this particular aircraft?

A. I looked through quite a few of them.

Q. Did you note that the cyclic stick off center had been listed as a deficiency on the aircraft?

A. Yes, I did.

Q. Did you determine why it was off center?

A. In disassembling it we found elongation on the torque tube that was directly under the cockpit floor where a taper pin holds the stick to the torque shaft. I think that was one reason, and there could have been some miscellaneous drilling.

Q. Would you have corrected that situation before you let the aircraft fly?

A. It's a hard question. I'm not a maintenance officer in an operating squadron.

The aircraft when it was reported defective was rig checked, and it was found to be within rig, and they allowed it to fly again as one of the gripes they lived with (p. 60) with the aircraft.

• • •

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
RICHMOND DIVISION

DELBERT BOYLE, ETC.,

Plaintiff,

v

CA-840486-R

UNITED TECHNOLOGIES
CORPORATION,

Defendant.

July 22, 1985

Richmond, Virginia

Before: HONORABLE RICHARD L. WILLIAMS,
United States District Judge
AND A JURY

Appearances:

JAMES E. MOORE, ESQ.
LOUIS S. FRANECKE, ESQ.
MICHAEL B. MOORE, ESQ.
For the plaintiff

LEWIS T. BOOKER, ESQ.
For the defendant

* * *

(p. 44) Mr. Franecke: Thank you, Your Honor. Stipulated set of facts filed today with this court. Aircraft Bureau Number 157151, a United States Marine CH-53 D. Helicopter crashed on 27 April 1983 around 12:00 noon approximately 200 yards aft of the U.S.S. Shreveport off of Virginia Beach, Virginia.

The crash occurred within three nautical miles of the Virginia coast.

The United States Navy Salvage Crews found the aircraft within five hours of the crash. The salvage crew found the aircraft inverted in the mud at a depth of 35 feet.

(p. 45) At the time the aircraft was found, visibility was three feet with the current running at approximately zero to two knots.

Lieutenant Boyle's body was found in the aft cabin of the crashed helicopter.

No parts or pieces of the helicopter came off or fell off prior to the helicopter impacting the water.

Lieutenant Boyle did not suffer any injuries on impact, and died as a result of salt water drowning.

There were small cuts on Lieutenant Boyle's left hand and wrist.

Lieutenant Boyle was an exceptional swimmer. The co-pilot's escape hatch was unopened, and the shear wire attached to the escape hatch knob was unbroken.

A salvage operation by the United States Navy took from 27 April through 1 May 1983. During the course of the salvage, the main body of the aircraft was raised and lowered to the bottom one time.

Additional damage to the hull of the aircraft was sustained during the salvage operation.

Hydraulic samples run on the aircraft on 21 April 1983 showed no significant findings.

There were no significant maintenance on the aircraft after April 21, 1983, although it was undoubtedly serviced after then.

(p. 46) The AFCS roll servo was completely reworked by defendant U. T. C. in the first quarter of 1982. It was repaired at the Naval Air Rework Facility, Pensacola, Florida, in the fourth quarter of 1982.

Lieutenant Boyle's body had on it various personnel effects including a new testament.

Plaintiff was a First Lieutenant in the United States Marine Corps earning \$1,660.80 per month basic pay, plus flight and other benefits pay. He was survived by his parents, Mr. and Mrs. Delbert Boyle, and three sisters.

Your Honor, that concludes reading of stipulated facts.

* * *

(p. 51) A. Yes, sir. My name is Burt Tussing.

The Court: Spelling your last name for the record.

A. T. U. S. S. I. N. G.

Q. By whom are you presently employed?

A. I am employed by the United States Marine Corps.

Q. What capacity?

A. Presently I am assigned as the branch head of the CH-53 Division of the Marine Air Weapons and Tactics Squadron, in Yuma, Arizona.

Q. Does that entail the flying of the CH-53 helicopter?

A. It does.

Q. Are you a United States Marine Corps aviator?

A. Yes, I am.

Q. When did you receive your training as a United States Marine Corps aviator?

A. I completed my training for my initial designation as naval aviator on May 13, 1977.

Q. What type of training did you have just in general (p. 52) with regard to becoming an aviator pilot?

A. Okay. I began with aviation indoctrination, ground school, if you will.

Immediately following that I went through primary prop trainer, flying the T. 34 Bravo at Saufley Field in Pensacola, Florida. From there I went through what we call the helicopter PIOE line and provided in my training at N. A. S. Whiteing Field where I began training initially once again in a prop, the T. 28 Trojan. And after completing there, I became trained on the T. H. 37 Jet Ranger, and finally the SH-1 Echo prior to receiving my designation. Upon designation I was transferred to the Marine Corps Air Station in New River, North Carolina where I went through the Marine helicopter training squadron 204 and was designated as the co-pilot in the CH-53.

Alpha and Delta.

Q. That is the CH-53 helicopter, is that right?

A. Yes, sir.

Q. You say you were designated as co-pilot. Did you have experience as a co-pilot in a CH-53 helicopter?

A. Yes, sir, I was a co-pilot for a combined time of—well, counting my flight training prior to arriving at New River. for combined time of 660 hours prior to my designation as helicopter aircraft commander.

Q. When did you become a helicopter aircraft commander?

(p. 53) A. It was, I believe, in February of 1979.

Q. Up until approximately 27 April 1983 were you continuously then CH-53 helicopter pilot or commander?

A. Well, yes and no, sir.

In 1981 I was transferred to Camp Lejeune in North Carolina right across the river from New River where I did a one year ground tour. Immediately upon completion of my ground tour at Camp Lejeune I went back to New River and resumed Active Flight status.

Q. All right. Up until April of 1983 approximately how many flight hours had you accumulated in the CH-53 helicopter?

A. Sir, I would say 15 to 16 hundred hours, or—in the CH-53?

Q. Yes. That would include the 600 some odd hours that you indicated as co-pilot?

A. Approximately 12 hundred hours. 12 or 13.

* * *

Q. Yes, Your Honor.

Captain, as a part of your training both as co-pilot (p. 54) and as a pilot for the CH-53 helicopter did you have occasion to have what would commonly be known as egress training?

A. Yes, sir.

Q. What is egress training?

A. Egress training is basically once a year in the fleet Marine Corps squadrons we practice getting out of the helicopter.

It is in a sterile environment, it is a dry drill, usually a guy standing out, and particularly in the 53 standing outside of the window to catch you to keep you from falling off of the stand they have available there.

Q. Go ahead.

A. Okay.

Q. Is this done both the pilot and co-pilot side?

A. Yes, sir, it is.

Q. And is this done in an actual crash situation or are you in a hangar somewhere?

A. We are in a hangar or out on the flight line. There is no way of simulating a crash. What they do do, if I might expand, is they will simulate as much as possible the worst conditions. They will go ahead, you will simulate the aircraft is in fact on—you are blindfolded, and people at that point say you are going along and you have just come in contact with an emergency and are screaming at you, hurry up, shut down the airplane and get out.

(p. 55) Q. You are then to exit the aircraft through various routes of the aircraft, is that correct?

A. No, sir.

Q. What are you supposed to?

A. What we are—what we train in doing is getting out the primary egress routes, which is of course the emergency exit window on the pilot's or co-pilot's side.

* * *

(p. 56) ... Do you know the training that Lieutenant Boyle had in egress training under water?

A. Yes, sir, I do.

The Court: All right. Fine. Tell us that. That is what the jury wants to hear.

A. Very well, sir.

Initially Lieutenant Boyle went through what is called the double dunking in Pensacola in the first segment of flight. That was basically a simulation cockpit of a fixed wing type, either a jet or a prop. And it simulates the cockpit is already gone, rather the bubble over has already gone and all he has to do is go out the front. Subsequent to that time Lieutenant Boyle went through training in a device that has lines. Flight training at that point which is a mock up of a transport type helicopter. And at that point they went through several times getting out of the helicopter. Initially through that primary egress route of their windows, and then on further excursions if you will they would go out other exits if the primary route was denied them.

Q. That primary route of course being the windows next to the pilot and co-pilot?

A. As I understand it. I have to plead ignorance after that.

(p. 57) The Court: If you can't get your window out, or it is blocked, can you use the pilot's window by just moving over to his side?

A. That is an exit, yes, sir.

The Court: That would be a secondary exit?

A. Yes, sir, and there are tertiary exits.

* * *

(p. 58) Q. Now, Captain, what does this picture represent?

A. It represents a cockpit of a CH-53.

Q. Obviously it is not an actual picture, but it is a schematic?

A. That is correct.

Q. Where would you as pilot in command be in fact sitting?

A. For the most part in the right side.

Q. The one on the right-hand side there?

A. That is correct.

The Court: Counsel, do you have a long pointer or anything with you?

Mr. Booker: I have one.

The Court: How about volunteering it so that the —here is one.

Q. That is the right-hand side?

A. Yes, sir.

Q. And where does the co-pilot sit?

A. On the left-hand side.

Q. What is that group of instruments that is down in (p. 59) between the two seats?

A. The lower console? Okay, it is the lower console.

Q. The lower console, all right. There are what is contained on the lower console generally?

A. Generally we are talking about the communication radios, the AFCS control box, the fuel control panel switches, and the navigation, TACAN and ADF.

Q. All right.

Let's go to the flight controls for a moment.

How do you control the roll, pitch up pitch down of the helicopter?

A. That is controlled with the cyclic stick, sir.

Q. Would you point out the cyclic stick?

A. That is it.

Q. That is the cyclic stick. Does that sit generally between your legs and you hold it with your righthand?

A. Yes, sir.

Q. Is there any other flight controls that you utilize in the flying of the helicopter?

A. Yes, sir, there is the rotary rudder pedals which you can see only the left side very well. And incidentally, just for the jury, these are all dual controls so that either pilot can operate them, okay?

There is also the collective stick which is generally held,—well, it is held with the left hand.

(p. 60) Q. Held with the left hand?

A. Yes, sir.

Q. You pointed out the dual control. What do you mean by dual control, by the pilot and co-pilot?

A. Either pilot can independently operate the aircraft.

And—

The Court: But using the same controls?

A. No, sir. Using their set of controls.

The Court: You have independent controls for the pilot and co-pilot.

A. Yes, sir.

The Court: All right.

Q. May I clarify that? When you move the pilot's stick, does the co-pilot's stick also move exactly the same?

A. Yes, sir.

Q. Is there some form of mechanical linkage between the two of them?

A. Yes, sir.

Q. I see. So they are not—they can't be moved in different directions—

A. No, sir.

Q. —At the same time? Okay?

A. Not properly.

Q. Not properly.

Now, on this stick, the cyclic stick, there are (p. 61) various controls also for your fingers, are there not?

A. Yes, sir.

Q. On the CH-53 that you were flying at the time of the accident, do you recall what controls were actually on the stick itself?

A. Okay. The same controls that are always on the stick. We have got the trim control for the lateral—and pitch trim. And you have got the I. C. S. control—and the radio control.

Q. Is there any control on the stick itself to adjust not adjust but to turn on or off the AFCS servo mechanism?

A. Not on the Marine-Navy configured CH-53, no, sir.

Q. All right. Is there some control for the AFCS system in the helicopter cockpit as we see it there?

A. Yes, Sir. The one I referred to on the lower console. It is exactly centered in that picture.

* * *

Q. Now, you say the co-pilot is over on the left, is that right?

A. Yes, sir.

Q. Is your cyclic stick as a pilot next to or on the other side of the pilot's escape handle?

A. Cyclic stick, sir, is right there where we left it between my legs.

Q. Is your collective handle?

A. No, sir, it is not next to the emergency escape handle.

Q. Is the collective handle of the pilot's, co-pilot's next to his emergency handle?

A. It is, let's call it close proximity to the emergency handle.

Q. All right.

The collective moves up and down, does it not?

A. Yes, sir.

Q. I would like to show you a picture—

The Court: Well, number 19 on that schematic is the co-pilot's collective pitch lever?

* * *

(p. 65) Q. Exhibit 7, there are two photographs, are there not, as part of Exhibit 7? This is one of them?

A. Yes, sir.

Q. This shows, I believe, the collective handle, does it not?

A. At this angle, yes, sir.

Q. It shows it in what position?

The Court: Is that the pilot's collective handle or co-pilot's.

Q. Is that the co-pilot's?

A. Yes, sir, that is the co-pilot's handle.

Q. All right. What position is the collective handle in?

A. I would judge that to be full up, sir.

Q. Full up. Could you point out again for the jury the escape handle for the co-pilot?

A. Yes, sir, right here.

Q. All right. That is the co-pilot's seat?

A. Yes, sir, it is.

Q. All right.

(p. 66) I would like to show you the other photograph that has been marked as Exhibit 7.

This is—what does this show, Captain?

A. It shows the same basic area, sir. Here is the co-pilot's seat. And here is the collective all the way up. And right down here you can see the bottom portion of that emergency release.

* * *

(p. 76) Captain, I would like to take you to now 27 April 1983. Was there some form of military exercise that you were participating in and around that time period?

A. Yes, sir, Operation Solid Shield.

Q. Generally what was that?

A. Basically that is where a lot of the military units, Navy, Marine Corps Army and even the Air Force get to

have and have one combined exercise that usually takes place off the east coast.

Q. Had you been stationed at some particular place in and around April of 1983 for this Solid Shield?

A. Yes, sir, I was deployed with the squadron aboard the U.S.S. Nassau.

Q. What was your capacity at that point besides being naval aviator aboard the U.S.S. Nassau in and around April of '83?

A. Weapons and Tactics Instructor.

Q. What is that?

A. Basically what the Weapons and Tactics Instructor is someone who has undergone what we referred to as graduate level flight training out at the Marine Corps Base in Yuma, (p. 77) Arizona with the staff which I am presently assigned twice a year. Now the Marine Corps has this training where purportedly the best aviators, best junior officers from the squadrons are sent out to Yuma to undergo this training, and after they have undergone the training they are then sent back to the squadrons to more or less spread the wealth, if you will.

* * *

Q. As you board the aircraft or board the ship, I would like to take you specifically to 27 April 1983. Did you have occasion to fly the stipulated aircraft, Bureau 157151, on that particular day?

A. Yes, sir.

Q. Can you tell us first of all when did you first happen to fly that aircraft that day?

(p. 78) A. Oh, that day, yes, sir. We had an early morning launch. We took off at approximately, I am sorry, about 0420 in the morning. We flew for some time until I believe we recovered about 0750. So we had already been flying that morning with the aircraft.

Q. I see.

The Court: When you say recovered, you mean you come back to your carrier?

A. Yes, sir.

The Court: You launch and recover.

A. Yes, sir, launch then a little exercise, and then came back and shut down.

Q. Okay. —

Who was on board the aircraft in that early morning flight?

A. All right, sir. In the early morning flight it was myself, Dave Boyle and Staff Sergeant—well then Sergeant Tubbs. We were supposed to have another crewman, Lance Corporal Trickett, but he overslept.

Q. Okay.

Had you flown—correction, what position or what ca-

Q. What position did Staff Sergeant Tubbs have?

A. He was the Crew Chief.

(p. 79) Q. We have talked about a co-pilot. Can you explain what a crew chief is?

A. He was my co-pilot, sir.
 capacity did Lieutenant Boyle have on 27 April 1983?

A. The crew chief is basically the guy who not only works on the helicopter, he is our mechanic, but also supervises everything that goes on behind the pilots, if you will. When we are loading troops he is the one that directs the troops. When we are loading cargo, as we often could in the CH-53, he assures it comes aboard so it is aerodynamically adaptable and not misloaded in the back, to preclude some of that imbalance that you were referring to earlier where loads are sitting in the helicopter.

And makes sure that everything is chained down properly and not adrift in the back.

* * *

(p. 82) Q. All right. Now, let's talk about you yourself.

You talked about flying the aircraft in the early morning, is that correct?

A. Yes, sir.

Q. Did you then fly it a second time later on in the day?

A. Yes, sir.

Q. And approximately what time were you to be taking off on the second time?

A. Well we got off on time, it was 1130.

Q. That is when you actually took off?

A. Yes, sir.

Q. —Now going back to what you did before—

The Court: It wasn't flown by any other crew between then 0750 and 1130?

A. No, sir.

Q. All right. Now what did you do before taking off on (p. 83) the fatal flight? What was your procedure?

A. Okay.

When we recovered on the U.S.S. Nassau, the first thing that we did was we went down and they had little box breakfast for us. We ate and then I went off and crashed for another hour and a half approximately for a nap.

Then we got back together at 10:00 o'clock, had another brief for the flight with the flight leader, my commanding officer at that time, Lieutenant Colonel Hank Peter. He had gone and de-briefed with some of the heavier people out on the operation. And they talked about what went right and what went wrong and how we were going to change things. That was all just in the actual operation.

After the briefing, we went up on the flight deck. Normally in order to expedite the passage of the aircraft off of the flight deck, because as soon as one takes off in a big operation they put another one on the spot and thread it and it will take off in sequence. In order to keep that process flowing you get up there a half hour before your scheduled take off time.

We did. We got up on deck at approximately 1030, as a matter of fact 1030 or 1040, and while we were up there we took advantage of the opportunity to talk about what had actually happened on the earlier morning flight and what we were going to do again. We talked about, with the crew about (p. 84) it and Dave and I talked it over again.

Q. Dave you are referring to is Lieutenant Boyle?

A. Yes, sir.

Q. You and he worked closely together in this type of procedure?

A. The pilot and co-pilot always work closely together in this type procedure.

Q. Prior to taking off was there anything that you found about the aircraft that would be something either of concern or of a discrepancy nature to you that you examined more closely?

A. As I recall, sir, we had some minor glitches which were of no significance, didn't slow the process any.

And Staff Sergeant Tubbs had to manually set the whitaker valve in order for us to be able to spread. There was a problem with whatever electric signals go through the logic units to get the blades to spread themselves.

They had to manually set the whitaker valve and then the hydraulics were able to go where they needed to and the blades spread and we got the blinking flight ready light again and things were set for take off.

Q. You verified the mechanics of the system were correct, by mechanics, mechanics of the blade and the flight ready light were in fact proper for flight?

A. Yes, sir. I insisted that because we had this (p. 85) blinking light, ready light at us, I insisted Staff Sergeant Tubbs go up on the aircraft to look and visually verify all the locks that we said that that system was trying to tell me were in fact in.

* * *

(p. 86) Q. Was there anything about the fuel gauges that was amiss prior to the take off on this last flight?

A. Yes, sir. The same problem that we had with the first flight. Both of the main gauges were working fine. The number two external gauge was in-operative, and the number one external gauge.

* * *

(p. 87) Q. Did this represent to you any particular concern?

A. No, sir. Because as I said before, the gauges were not the most reliable creatures. So we were used to working in some cases with one of the gauges out. As a matter of fact, in some aircraft the gauges were literally out.

* * *

(p. 88) . . . was there anything amiss about the cyclic control sticks?

A. No, sir. No, sir, I conducted a flight control check on the first hop, and I conducted a flight control check again before we took off on the second hop.

Q. Was there anything about the co-pilot's control stick that it was off center when the pilot's control stick was centered?

A. Yes, sir, there was.

Q. Can you describe that for us?

A. Yes, sir, this was a gripe that had bothered me. Basically what it was was a mechanical, stictly mechanical.

The Court: That is his cyclic control stick that is off center?

A. The one between his legs.

The Court: All right.

A. When all of the controls were neutralized and the pilot's stick was centered, the co-pilot's stick canted to the left approximately two inches. Okay, this is not according to Hoyle.

But there was some type of mechanical problem with the stick. When I objected, I pre-flighted the airplane the afternoon before so I didn't have to pre-flight in the early morning hours in the dark, obviously you can see more in the light than in the dark, when I pre-flighted even before I (p. 89) went up to on the deck I saw this discrepancy in the book and as soon as I got out there I called to Staff Sergeant Tubbs about the problem and he said, well sir, it is all right.

Well, a good crew chief wants to get his airplane up in the air, so I wasn't willing to accept well, sir, it is all right. I went to what we refer to in the Marine Corps as quality assurance department, and I got, well, sir, it is all right from quality assurance as well.

And I talked to the pilot who had written the gripe who was maintenance officer at the time. Major Miller. And he said, well, Burt, it is all right.

Basically, the only thing that was wrong was it was just canted.

* * *

Q. Captain, did you fly the aircraft that morning for almost three and a half hours with the stick cyclic sticks or (p. 90) the one cyclic stick off two inches?

A. Yes, sir.

Q. Any problems?

A. No, sir.

* * *

(p. 91) Q. All right. When you fly one of these aircraft, what type of equipment do you wear—I am sorry, on the day of the last flight what kind of equipment were you wearing?

A. I was in the standard Nomex flight suit, which is an anti-flame—antiflame—a flame retardant material that we always wear. The flight gloves, the standard S. P. H. 3 helicopter helmet with visor, and I was wearing the L. P. H., (p. 92) which is a life vest that has inflatable collars and waist band, and also has survival equipment contained within the vest, and flight boots.

Q. How was Lieutenant Boyle dressed on that day?

A. Attired in the same outfit.

Q. You were talking about a helmet. What do you mean? Does it look like a football helmet sort of?

A. No, sir, it is a helmet with a large conical area for ear protection, and it is hooked up so that you can communicate over the radios by plugging into the aircraft's radio system and I. C. S., inter cockpit communication system, as well.

Q. I see. In other words, you have some kind of microphone on it and also ear phones that you can hear?

A. Yes, sir.

Q. I see. That is in the helmet?

A. Correct.

Q. You mentioned a visor or visors, what is that?

A. Yes, sir, there are two visors that we have on the S. P. H. 3 helmet. One for daylight use, bright sunlight use is tinted much the same as sun glasses, and the other one for mostly for night use is clear visor.

Q. You took off I believe at 11:20 a.m.

A. Yes, sir, as I recall.

Q. What kind of weather was it that day?

(p. 93) A. It was a beautiful day, clear, unrestricted visibility, as I recall, the ceilings were non-existent.

Q. By ceilings, you mean what?

A. I mean clouds. There were no clouds. It was just solid blue.

* * *

(p. 96) Q. On the day of the last flight before you took off did you check the longitudinal cycle throw, the lateral cycle, the collective and the pedal throw?

A. Yes, sir.

Q. Was there anything that you felt was amiss or was wrong with the throws of these instruments, or cor-

rection, (p. 97) these controls prior to going on the last flight?

A. No, sir, there weren't on my controls or on Lieutenant Boyle's controls, because he went through the same thing.

Q. Did this include evaluation of the two inches that the co-pilot's cyclic stick was canted over to the left?

A. That really doesn't apply. Once again, that was a mechanical thing what we are looking for is if we have free movement. The fact it started off two inches canted to the left doesn't apply, really doesn't figure in to whether or not you have still got that free movement.

The Court: Well, except that you can only then move it two inches to the left as opposed to the four inches to the left that if it were in the perfect vertical.

A. Yes, sir. I suppose.

The Court: And then you move it six to the right and two to the left, isn't that how the throw works?

A. The idea, yes, sir.

Q. Well, in normal flight then, to expand on his Honor's question, how far when you are in the air do you move the cyclic stick?

A. First of all, counsel, it depends on what you are trying to accomplish. The angle of bank and turn that you trying to initiate, okay.

And I really never sat down and said, okay I am going to 45 degree bank or pitch and that is four inches. It (p. 98) doesn't apply. I couldn't tell you how far it goes.

I go until—on this particular day I went until I hit the stops.

Q. Which we will come to?

A. Yes, sir.

Q. In the morning flight for three and a half hours did you execute various turns and maneuvers?

A. Yes, sir.

Q. Was there at any time that you knew or that you either felt the cyclic hit the stops or that the co-pilot, Lieutenant Boyle, had problems with the cyclic stick in performing the various maneuvers?

A. No, sir.

Q. Do you know whether or not they ever hit the stops, whether you ever hit the stops on the cyclic stick?

A. I knew for a fact it did not hit the stops.

Q. Did not?

A. No, sir.

Q. Even though the stick, co-pilot's cyclic stick was off two inches?

A. Yes, sir. In the normal maneuvers of flying the airplane if you hit the stops with the cyclic then you have over banked or over pitched or your nose is too far low, way too far.

Q. You are not supposed to fly it that way?

A. No.

(p. 99) Q. Going to the second item, control system force checks, did you perform such a force check on the last flight?

A. Yes, sir.

Q. Before the last flight?

A. Yes.

Q. What do you do?

A. All you are looking for there is to check—you have really, both things are accomplished simultaneously. While you are moving the control you are seeing if there is binding or restriction, if it is in fact harder to move than it normally is. If there is some question, that is when you call in the quality assurance people, or when you call the crew chief up and say we have a problem here and you don't proceed until the question is resolved in your minds.

Q. Now, I note that it says there, no servos. Do you perform this without these power steering servos turned on?

A. Yes, sir.

Q. Is it done without them on?

A. Yes, sir.

A. Initially.

Q. Initially?

A. Yes, sir.

Q. All right?

It says longitudinal cycle. What is longitudinal cycle. What is that?

(p. 100) A. That is talking about the longitudinal axis of the aircraft, if you will. So fore and aft.

Q. All right. That means—what does it mean that you do with the stick?

A. You are taking the stick all the way forward and all the way aft.

Q. If it feels like it is more than seven pounds, what do you do?

A. There is something wrong.

Q. So you should go back to quality assurance?

A. Yes.

Q. What is lateral cycle?

A. Lateral, that is moving the stick from side to side.

Q. Side to side?

A. Yes.

Q. Is that like roll?

A. Yes, sir.

Q. Okay. And again if it is higher than 7.5 pounds you would then check to see if it is something else?

A. If it doesn't feel right to me. Once again, there is not a calibrated arm in the room, at least not mine.

The Court: But is this an eye ball sort of feel sort of thing?

A. Yes, sir, eye ball.

The Court: What your understanding is.

(p. 101) A. Yes, sir.

The Court: Move along.

Q. Going now to page 13. Jim, put the next one up, please.

The third item is control system force check. Servos. What are you doing there?

A. Okay. At this point then you have brought the AFCS servos on. And you are checking them to make sure that you have free movement with the servos. And basically what they are, they provide an assist to the hydraulic system to where it doesn't take seven pounds any more, it takes as it says up there 14 ounces or 12 or something like that. You should have a free movement of the stick.

Q. You feel it to be like power steering in a sense?

A. In a sense.

Q. Okay.

Before taking off the aircraft on this particular day, did you feel anything amiss with the servos being on?

A. No, sir, I didn't feel anything.

Q. Before taking off, was the flight ready light in its proper configuration as the on or off?

A. The flight ready light before we could engage was—it was on.

Q. So you were ready to fly?

The Court: Even when you saw it on, it quit blinking?

(p. 102) A. Yes, sir.

At least long enough for us to get it on the line. Your Honor, quickly for your information the problem that we had with the flight ready light has something to do, and I can't go too much into this, but something to do with the emission of high frequency radio signals on board U.S. Navy vessels and the logic unit involved in our blade fold mechanism. Something is askew there. And a lot of time has been spent in trying to isolate what that problem is, but it is not—it is not a problem that was unique to 07 on that day.

The Court: Okay.

Q. Prior to taking off, just prior to taking off, correction—step back.

What was your planned flight plan just prior to taking off? What were you intending to do on this last flight?

A. As I recall, sir, what we were going to do was we were going to take off once again as a flight of four. This time we were going to go to the U.S.S. Nassau to the U.S.S. Inchon, and there on the Inchon we were going to make a simulated troop pickup, meaning that we weren't going to pick up any troops but we were going through the motion for timing cycle I suppose more than anything else.

And at that time we were going to proceed from the Inchon to overhead the amphibious and regroup there, (p. 103) including the Nassau the Inchon and the Shreveport. And if you other vessels came along with it, we were going to remain overhead for a period of one hour

before we went inland to simulate dropping the troops off and then going back out to the ships.

Q. I see. Who was on board the aircraft when you took off on the fatal flight?

A. The flight in question, once again it was Lieutenant Boyle, myself, Staff Sergeant Tubbs, and Lance Corporal Trickett.

Q. Trickett had gotten up?

A. Yes, sir.

Q. All right.

How long—well, take it then in sequence.

What did you in fact do while you were on the last flight?

A. We took off from the Nassau and proceeded over to the Inchon. We were a flight of four. Due to deck space availability and a little bit of delay in the flight aboard the Inchon getting off they could only take two of the four aircraft, so the first two aircraft went down and landed while aircraft number three, which you will probably hear as a dash three, and ourselves remained overhead circling.

As soon as lead and dash two loaded simulated their loading and took off, then we were cleared to come in and (p. 104) land on the spot. Once that was accomplished, we took off and re-joined the supply and entered the holding pattern that I talked about.

Q. Okay.

Was Lieutenant Boyle doing some of the flying during this time period?

A. Lieutenant Boyle was doing some of the flying, yes, during the time that we were out there. The problem that we had had during the early morning cycle as well as this cycle was Dave being in the co-pilot's seat in the left-hand seat and being an inexperienced pilot was in no position to land aboard either the Nassau or the Inchon. Because of the approach that you have to make the best view is provided in the right-hand seat. So, more often than not the pilot in command or the helicopter aircraft commander will take that approach and landing. Dave had been riding basically on all of the landings up to that point.

Q. All right. You said he was an inexperienced pilot, what do you mean by inexperienced?

A. Well, relatively inexperienced. He had been with the squadron out of the training squadron for I think maybe as much as four months, and that is how long he had been in the squadron. He was certified as a co-pilot, but that is kind of like the beginning of your training in a tactical Marine Corps helicopter squadron.

(p. 105) Q. I understand. Did something happen that was different than what you had planned for your particular flight that day?

Did you do—was there some diversion that you were scheduled to do?

A. I am not sure I understand the question.

Q. What did you do after you had done the carrier landing? What was your next sequence of flight activity?

A. Okay. What we were to do afterwards was to remain overhead circling until we were cleared to go in

on the beach. One thing that did happen during that time was for those of you who are familiar with the area, we were off of Virginia Beach and close proximity to Oceana Naval Air Station. A lot of helicopter activity going on in our squadron and another squadron on the Inchon. And Oceana still had its pattern going, so we had to go coordinating to make sure the helicopter remained well below Oceana traffic.

Our commanding officer arranged that coordination with Oceana and passed the information back to the Nassau and the Inchon to pass on to the other helicopters. So we were to remain below I believe it was below at or below 300 feet when in proximity to Oceana.

Q. At or below 300 feet?

A. Yes, sir.

Q. How long did you stay in this holding pattern?

(p. 106) A. I don't recall. I believe it was about 40 minutes, 45 minutes, maybe as much as an hour.

Q. At sometime later there was a problem with the air craft, as we know. Approximately what time did the aircraft crash, to your recollection?

A. To my recollection, and this is based upon my recollection and reports afterward, it was about 12:20.

Q. You had taken off 11:20 and crashed at 12:20?

A. Yes, right.

Q. In that hour's period of time did you have occasion to transfer fuel or cross feed fuel in any way?

A. I cannot recall vividly the actual act at that moment two years ago of transferring fuel.

However, as I explained earlier, during the normal course of operations when the fuel burns down to 15 hundred pounds a side we would normally transfer fuel out of the externals into the mains to bring it back up to 2,000 pounds a side. We had been in the air nearly an hour and the fuel flow rate if you will, the burning rate is about a thousand pounds an hour for the CH-53 per engine. Okay, so in a half hours time we would have burned off 500 pounds a side so I will if I may, I would have only to assume I did transfer fuel during the time that we were in the air. And I am sorry for the assumption.

Q. Do you recall transferring fuel in a cross feed mode (p. 107) such that the fuel would only go over to the right-hand side of the aircraft?

A. I do not.

Mr. Booker: If he doesn't recall transferring it at all, how can he recall which way he transferred?

The Court: Objection is sustained.

Q. Well, did you utilize the cross-feed mechanism as your normal course of transferring fuel?

A. Normal course of transferring fuel, no, sir, it is not necessary to transfer from the right external to the left main.

Q. Or vice versa?

Q. Did you at any time while you were flying the aircraft feel any imbalance that might have been due to fuel prior to the crash?

A. No, sir, I did not feel an imbalance.

Q. Okay.

Let's go to the accident sequence itself.

What led up to the accident sequence? Where were you going?

A. All right. We were at a thousand feet circling. Remaining pretty much out of everyone's area. After we circled for a while the U.S.S. Shreveport, and L. P. D., a smaller landing platform if you will, saw that we were up there not doing much of anything, quite frankly, and asked if (p. 108) we would—they came across over the central communication frequency and said, you have got some 53's up there, do any of them want to do some landing on an L. P. D.?

Obviously they didn't have much to do at that moment, either.

So, we welcomed the opportunity. The C. O. cut off dash three and myself and we left a thousand feet going down to what was going to be our pattern altitude for that particular ship, which was 300 feet.

I recall vividly at the time we are going we were descending from a thousand feet and the Shreveport was over basically to our right. We were setting up an approach that would have us in a right-hand turn as we were in the decent. I recall vividly at the time also as we were descending I was thinking about that 300 feet minimum that we, or maximum if you will, that we had to maintain to stay out of Oceana traffic pattern which we were moving closer to as we were moving into the Shreveport traffic pattern.

About that time Dave was doing the flying because this was giving him the first opportunity of the day to make an approach. Now the approach to the Shreveport or any L. P. D. is unlike an approach to a L. P. H. or L. H. A. because they can make an exact diagonal landing across the deck, you are not coming in in a sideward slight sliding manner, you are coming in with the nose of the aircraft lined up diagonal (p. 109) across the deck. As you can see on the slide he put up, you can approach either from left to right or right to left. We were making a left to right.

* * *

A. There are two landing spots.

Signified by those X's.

Dash Three was lining up for the first spot, we were lining up for the second. If I may regress a second, about the time I was concerned myself we were passing through very slowly there 500 feet. Dave was on the controls, and I had to admonish him to speed up his rate of decent because we were approaching Oceana traffic area.

He continued his descent and turned towards our landing line. Now, spot one is the one upper most, and spot two, the one we were going for, is the lower spot there.

(p. 110) We were making a left to right approach, so we were going to line the helicopter up so that the nose would be—the nose and the tail would land on that line, that perpendicular, I mean that X.

The Court: X.

A. There you are sir.

We had the belly of the aircraft hopefully lined up directly on that line. That is why Dave could do it just as easily as I could, because he had free view of it. When he did finally get down in altitude low enough and continued down to 300 feet, which was not only the altitude that we had prescribed with Oceana but also standard altitude at which we shoot any approach to a deck.

So he rolled out on 300 feet, but we were still a considerable distance away from the L. P. D.

Still too far away to commence his decent, because he had not hooked up with what we call the glide slope. Ideally on any particular landing, if you have to slip like this, you would like to arrive at a certain altitude and certain air speed so that you can lower your power and ride down what would be an ideal glide slope based upon the hacks. I quite frankly. We were still out a ways and if Dave had descended he would have gotten down low and then they would have to had to call what with we call air taxi in, which is not what you are trying to accomplish. I told him to hold the altitude (p. 111) that he had of 300 feet, and we continued to motor on in. As he hit the glide slope, or what I perceived to be glide slope, I said you are looking good now, go ahead and continue your decent. We continued the decent to that at that point.

As he continued on down he was also bleeding off his air speed very nicely to where at the point he was at the point of my recollection he was 45 to 55 knots and about 200 feet. And at that point we—backing up just a little bit, remember we had another plane in our flight who was in front of us, okay?

Now, you don't want to have two 53's over the deck at the same time because there is a lot of air and flight per-

sonnel could be blown over the side, you could make things more difficult for the guy landing in front of you or along side of you. So basically you would like to have dash one on the deck before dash two is in there over the deck for his approach.

Jake, pardon me, Captain Jacobs who was in the other aircraft at the time was, it appeared to me, slowing up very early, so that we were in turn going to have to either slow up ridiculously early or going to have to take a wave off or take it around one more time, in other words, turn around, set back up for another approach and proceed.

Q. Let me stop you there a second.

A. All right, sir.

(p. 112) Q. What would you be doing if you were going to do that wave off? Where would you go?

A. Because we were going to spot two, okay, and because it was a left to right approach, and because I was on the right-hand, in the right-hand seat, what I would have normally did, and what I attempted to initiate at that time, was I had the view, I saw where we were turning, I would take the aircraft, execute a 360 degree turn around to the right, and then set back up on the same approach line that he had going in initially.

Q. All right. Let me stop you there a second.

How far, approximately, were you from the Shreveport at the point that you believed that you had to do a wave off or go around?

A. I really wouldn't even want to guess that, sir.

Q. Did you happen to look at Lieutenant Boyle to see what position his visor was on his helmet?

A. Dave's visor was down from the time we took off from the Inchon.

Q. You mean the sun glasses type thing?

A. The dark visor was down.

Q. Was yours in the same position?

A. Yes, it was.

Q. Okay.

All right. Now, what happened, if you can tell, what (p. 113) was the first sequence of events when you began to realize that you were going to do a wave off or wave around?

A. Wave off.

Q. Wave off.

A. About the time that I was thinking in my own mind that Jake's approach was too slow and that we were going to have to slow down, at that point Dave, Lieutenant Boyle said, I am going to take this one around. I thought that he was going to take it around for the same reason that I would have, that we would be rushing the other craft. He said—I said, fine I have got the controls. And I took control of the helicopter and initiated the right-hand turn as I described I would have normally done to set him up for another approach.

Q. How do you do that? What do you do when you initiate the right-hand turn as you did on that day at that time?

A. What you would do, since he was in a decent, you would be simultaneously doing several things, bringing in

the collective to bring in the power to stoop the rate of decent, you don't want to go down further because you want to come back and pick up the glide slope where you left it, and you initiate the right-hand turn in our particular case here. You do that by—

Q. They can't see you.

A. I am sorry. Pilots talk with their hands a lot. I am sorry. You initiate the right-hand turn as you do that by (p. 114) putting in that lateral movement that we talked about. In a helicopter if you want to retain the turn you just maintain the stick in the position after you get the angle of bank that you want. So what I had done, I brought in the collective to stop our rate of decent and initiated a right-hand turn.

Q. By moving the cyclic?

A. To the right.

Q. Okay.

A. Okay. At that point, initially there was no real concern in my mind because I wanted the stick to go to the right. It was going to the right and everything seemed according to Hoyle.

Q. Let me stop you. What was the aircraft doing as you moved the cyclic to the right?

A. The aircraft was doing what I wanted it to do. It went to the right.

Q. It was rolling?

A. Correct.

Q. To the right?

A. Correct.

Q. Okay.

A. Okay.

Q. Started rolling right?

A. Yes, sir.

(p. 115) Q. Then what happened?

A. At this point, however, the stick continued on over—over to the right on its own, uncommanded flight control input, if you will.

It continued over to the right. And initially I am sure I was helping it because I wanted it to go to the right, but then I tried to bring it back and I couldn't get the stick back.

Q. Did it—let me stop you there a second. Did the stick drive against your hand—

Mr. Booker: I object to that as leading.

The Court: Counsel, just ask the questions. I allowed some leading. This may be one of the instances that it isn't—it is counter-productive.

Q. How did the stick feel in your hand as it continued over to the right?

A. Quite frankly I do not recall the feeling as the stick went over to the right. All I could recall vividly is the fact that I could not get it to go back over to the left. I could not bring the stick back to the left.

Q. Why were you trying to get it back to the left?

A. Because I wanted, as we continued the stick to the right the airplane continued to go to the right, and I saw it

was going without my input. So that as the aircraft continues to a certain degree you are going to lose the lift (p. 116) that is keeping you in the air, okay? I don't know that the thing with enough altitude might roll inverted completely. I had never approached that region in a 53, and I never hope to. But anyway, because the aircraft continued to roll to the right, I was trying to bring the stick back. By bringing the stick back I would stop that roll. Normally. I couldn't. I could not bring the stick back to the left. As we continued through at this time there was an expletive that came across on the I. C. S., and I continued through. And the stick drove—was all the way. How we got there, I don't know. I don't want to speculate. But the stick was all the way against my leg and the stick, my body, my shoulder, was against the right of the seat or against my leg as far as it could go. I was over on the right. I tried to bring the nose up, I couldn't bring the nose up.

Q. How do you do that?

A. Okay. You bring the nose up by pulling aft on the cyclic. There is a couple reasons why I couldn't bring the nose up. I know this, your honor, from having reviewed it myself, so if I might for just a moment.

One, because I was all the way over to the right with the stick, there was no place for me to go backwards on the stick. The stick at this point was against my leg.

Secondly, if a pilot wants to raise his nose and bring the stick back to the left at the same time, then it is not a (p. 117) matter of I am going to go left and back. What you would do is pull in a diagonal motion, if you will, to in one motion up right the aircraft and to bring the nose up or stop the roll and bring the nose up.

From what was explained to me—

Mr. Booker: If Your Honor please, I am going to object to something that was explained to him.

The Court: The objection is sustained.

A. Very well.

The Court: Counsel, instead of giving him an invitation to give us a narrative run off, ask very precise questions and move it along.

Q. Yes, Your Honor. Did you attempt to raise the nose as you have just described?

A. I did attempt to raise the nose with the cyclic, and the aircraft did not respond.

Q. Did you hear Lieutenant Boyle make any comment regarding this situation?

A. Prior to the initiation as when I first initiated the right-hand turn Dave said, I can't get enough left cyclic.

Q. Was that—well, all right.

Did you make note of that at that time?

A. There was no particular alarm associated. As I recall I thought that he was more or less irritated, but it did key me that something maybe wasn't right, as it turns out. In my (p. 118) mind it was an unrelated thing, but it was different if you will, and that is the last transmission I heard from Lieutenant Boyle.

Q. Could not get enough left cyclic. What was the airplane doing as the—as your cyclic stick was over pinned against your leg?

A. To my recollection, I was in the middle of about to have an aircraft crash so—recollection being what it is, as I proceeded the aircraft banked approximately 60 to 90 degrees and it was coming around rapidly.

Q. What do you mean by around?

In a circle?

A. That is correct. Okay?

In a circle. As it came around I was looking outside, of course, and all I saw was the sea coming up at me. Apparently we were down what I estimated at one point to be ten to 20 degrees nose down and 60 to 90 degrees angle of bank.

The sea was coming. I didn't have anything that I could do with the cyclic that amounted to any good, so all I had left was collective. And as I was coming towards the deck I remember the only thing that I had in my mind is if have got to stop this dive, and I wanted to pull in the collective in order to get the rotor head to pull the entire air frame up enough to make what I was hoping was going to be (p. 119) a relatively level impact as opposed to burying the nose into the water. So I pulled all that I could get out of the collective, pulled up, and as fortune would have it, it did make for a relatively level, somewhat relatively soft impact to such a degree that I discovered the next day that my crew chief was not initially knocked off of his feet in the back. You couldn't have verified it by me, Your Honor, because I could have hit a cloud or a brick wall at that point with what my body was doing for me, but that was just in retrospect. So apparently we made a relatively soft impact. Shall I proceed with what happened from there?

Q. Well, let me back up a little.

At any time from the time the stick was pinned to your right leg until you impacted the water were you able to move the cyclic off of your right leg?

A. I do not recall.

Q. Okay.

Do you recall the aircraft ever doing such a maneuver that would indicate that you were able to get the stick off your right leg?

A. I don't recall the aircraft coming to right itself at all, no.

Q. Did you have time to see if you could determine what was going wrong with the aircraft?

A. From the time that I realized we had an emergency to (p. 120) the time we impacted the water I would give it the realm of approximately five seconds.

Q. That quick?

A. That quick. About two hundred, because we were on short final to the L. P. D. about 200 feet, 45 to 55 knots it doesn't take long for a helicopter that size to fall.

Q. Did you try to turn off anything?

A. My only idea at that point was try to do the best I could with the flight controls.

I believe very sincerely if I had let go of anything, specifically the collective, to turn off anything, if I had thought to turn off anything, quite frankly we would have all died.

Q. Would have impacted harder?

A. Yes, sir.

Q. All right.

Did the aircraft feel as it was in this turn that there was any kind of an imbalance in the fuel system.

A. I couldn't say, counselor.

Q. All right.

Had you made any other right-hand turns at and near that time period?

A. Yes, sir.

Q. Did you feel any imbalance at that time?

A. No, sir.

(p. 121) Q. Had you transferred fuel from the time you had made those other right-hand turns until you made the last right-hand turn into the water?

A. No, sir. You recall when I came down from a thousand feet from my initial turn to the L. P. D. was a right-hand turn, and it went all according to Hoyle.

Q. Were you at approximately the same air speed?

A. We were starting to decrease our air speed from approximately 80 to to a hundred knots in the holding pattern down to the 45 to 55 knots I was talking about.

Q. Okay.

-What part of the aircraft, if you know, hit the water first?

A. My side.

Q. Your right-hand side?

A. Yes, sir.

Q. Can you describe for us what you recall as being the manner in which the aircraft actually hit the water?

A. As I recall, we hit in the nose low right wing down manner.

Q. All right.

A. For the edification of the jury, if I came in and landed exactly flat that would appear to be nose low for me because the CH-53 normally lands in approximately an eight degrees up, eight degrees up as you are coming in like (p. 122) this. Okay, so landing flat would be out of the norm.

To enter nose low the way we did into the ocean that day, was well out of the norm.

Q. I see.

Can you describe for us what you did, what you felt, just after the impact in the water?

A. Yes, sir. As soon as we hit I was a bit surprised because as soon as the rotor stops the generators all off the line and none of the electrical system was working, but as soon as we hit I began screaming, get out, get out, and I heard it go over the I. C. S.

At that point I automatically without even thinking about it I reached for my emergency egress handle. As I grabbed the handle, I looked up and I saw what appeared to be just four inches of light between the top of the 53 window and the water line. That is all I was seeing.

I perceived at that moment the aircraft was rolling right. Due to that when I released the handle, I pushed the window out, which in retrospect might have been a pretty good trick considering there was water against the window, but it wasn't going to hold that day, and I pushed the window out, released my harness which held me into my seat, the same type of harness that held Dave into his seat, and I exited or I got out of the helicopter. Because I thought the helicopter was rolling right, I thought it was going to roll over on top (p. 123) of me, so I swam down to get away from what I thought was the wreckage rolling over on me and out. After what seemed to be a relatively long period I broke the surface. I came up on the surface, and I was up long enough to get a breath and maybe one or two seconds. And that is when water rushing back into the helicopter somewhere into an empty area, cabin, whatever, pulled me back to the helicopter, back inside and back under.

I at that point was frightened.

Q. Let me stop you there a second.

You have now been sucked back down into the helicopter. Could you see?

A. No, sir.

Q. Why not?

A. Because it is ocean water, it is Virginia Beach, it is brown.

Q. Okay.

A. The helicopter was rapidly filling up with water, and it was sinking. As you already attested, it was sinking in about 35 feet.

There was no orientation at that point.

A. And my visor was down.

Q. You had your visor down?

A. Yes.

Q. Like sun glasses.

(p. 124) How much time elapsed from the time you impacted until you were able to swim out the first time?

A. I give it 30 seconds, because everything was automatic.

Okay. From the time that I stopped screaming, get out, get out, get out, until I was out of the airplane, 30 seconds is a broad figure.

Q. That was when you actually were back up on the surface of the water?

A. Oh, no. When I was out of the helicopter. The time it took me to break surface again, I don't know. It seemed like a long time, but I was looking for air.

Q. You were in your harness?

A. Correct.

Q. Lieutenant Boyle was also?

A. Yes, sir.

Q. You released your harness?

A. Yes.

The Court: Counsel, that is repeating what he said. Ask him questions.

Q. All right.

When you were sucked back into the—correction. Before you exited the helicopter the first time, where was the water coming from?

A. Okay. I recall the water most vivid recollection was (p. 125) the water coming up through the chin bubble and through the lower windshield immediately upon impact. Of course that little bit of plexiglass gave way and the water was coming up, so it was coming up from the floor at me.

Q. I would like to show you Exhibit Number—we refer to Exhibit Number 2.

In your exhibits.

A. Yes, sir.

Q. If I may approach the jury with this, Your Honor.

The Court: Yes, sir.

Q. This Exhibit 2 shows which side of the aircraft, captain?

A. This is Aircraft 07 after they had maybe recovered it. This is the co-pilot's side.

Q. When you were referring to the chin bubble, what are you referring to?

A. This is the chin bubble, bubble.

Q. It is your understanding that was broken out at the impact?

A. There was no question but that was broken out at the impact.

Q. Water was pouring up?

A. Wat was coming up.

Q. All right. Put the other side on, please.

Is also the same exhibit, only a different photograph?

(p. 126) A. Yes, sir.

Q. Is this the same aircraft?

A. Yes, sir.

Q. Now, again, would you point out the chin bubble that had broken on the impact?

A. This here is the chin bubble. This, incidentally, not to over-state the obvious, is my side.

Q. Yes. That looks like there is a considerable amount of damage on that side?

A. Okay.

Q. Do you recall whether that was the case after you had impacted?

A. In fairness, this broke out and this broke out. A lot of this damage occurred afterwards as the aircraft settled, because the aircraft when it rolled, it more or less settled on that side. And some of the aircraft weight crushed that area up there. I don't want to be over dramatic, but this area here was broken out.

Q. Well, what I am getting at is the—your escape window which would be up on your right-hand side?

A. Yes, sir, it would have been right up here.

Q. Okay. Was the airframe or the metal surrounding the window, was that broken away?

A. No, sir.

Q. Such as it indicates there?

(p. 127) A. No, sir, that there is reinforced.

Q. That was not broken away at the time of the impact?

A. No, sir.

Q. Which way did the aircraft roll in fact when you impacted?

. . .

A. Yes, sir. The aircraft subsequently rolled back to the left.

. . .

Q. Referring again to the—stay there if you would, captain?

Referring again then to the sponsons and the auxiliary bullet-like fuel tanks on the right-hand side.

A. Yes, sir.

Q. Were they tron away at impact?

(p. 128) A. I know for a fact that they were torn a way.

Q. Why do you know that?

A. When I came out the second time, the first thing that I saw was my—my first mate on top of what I have to assume, I don't—I don't assume, I know for a fact was the auxiliary fuel tank. Much like a fisherman on a boat who has turned over.

Q. How much weight would you estimate was in each main and auxiliary just prior to impact?

A. We have been flying for an hour. If we left with 4,000 pounds a side it would be 3,000 pounds a side.

Q. All right. So that one 3,000 pounds wasn't there. What about the other side on the left-hand side? Was there still the 3,000 pounds worth of fuel on the left-hand side?

A. I would say easily approximately 3,000 pounds, yes, sir.

Q. Okay.

And would that indicate to you why the aircraft rolled left?

A. That is a pretty good reason I think, yes, sir.

Q. Now, where were you sucked back into the aircraft?

A. I don't know, counselor. Some orifice somewhere pulled me back inside.

Q. Were you ever even able to see where you were sucked back in?

(p. 129) A. No, sir.

Q. Do you know how deep you were sucked down?

A. No, sir.

Q. It may be hard for the ladies and gentlemen of the jury to understand that. What was wrong? Why couldn't you see?

A. Because I was pulled back into some murky brown water. I had a visor over my face. A tinted visor. I was —there was a lot of rushing water helping to add to the

situation. I was pulled back into what then amounted to pretty much not a black hole, maybe a brown hole, and there was no orientation.

Q. Do you know whether you were sucked back into the cabin or the cockpit, or whether you may have been sucked back into the aft cabin?

Mr. Booker: I object. The witness has said twice he doesn't know where.

The Court: He can say he doesn't know and that will end it. Without guessing, do you actually know.

A. I can reasonably say, sir, that I wasn't pulled back into the cockpit because there are too many obstructions in the cockpit I would have been hitting while I was flying around looking for an exit. So I had to be back in a bigger area, if you will.

The Court: Which is the cargo space.

(p. 130) A. The cabin area, yes, sir.

The Court: All right.

Q. How did you get out?

A. I was flailing. I was down for some time. I found a hole after awhile, and there was light behind the hole and I pulled for the hole. And once I got through on the other side there was light and eventually air.

Q. Was the hole unobstructed?

A. I don't recall, sir. I got minor scratches I had gone in, either going in and out.

Q. Did you push out a window or anything?

A. I pulled out.

Q. You pulled out a window?

A. No, no, no. I mean I, I physically pulled my body out. No, I did not mechanically disengage anything.

Q. Do you know in fact what you pulled through, what part of the aircraft?

A. No idea.

Q. Okay.

How long do you think you were down that second time?

A. I can't say, other than it seemed considerably longer than the first.

Q. Were you—did you have sufficient breath? Now, I don't want to mistate this.

Did you have—were you gasping for breath by the (p. 131) time you got up, or did you have sufficient breath so that you were able to swim without difficulty to the surface?

A. I recall vividly swallowing quite a bit of J. P. 5, fuel as I came up.

Q. Okay. So you just made it.

Mr. Booker: Objection.

The Court: Don't do things like that, counsel.

All right.

Disregard it. That is improper. You know it, and I don't want it to happen again.

Q. I don't mean any disrespect.

The Court: What you did was wrong. Return to the witness box.

Q. When you broke the surface the second time, did you look for any of the other flight crew members?

A. As I broke the surface, as I said before, I initially saw the first mate. He was already up on top of the sponson. The crew chief was climbing or attempting to get up on top of the sponson. And it didn't take too long to realize that I didn't see the co-pilot. So I began calling for Lieutenant Boyle.

Q. Were you able to observe the aircraft itself after you had broken the surface?

A. All I recall seeing of the aircraft was portions of the tail area.

(p. 132) Q. When you say portions of the tail area, can you tell us or describe on this model what portion you are referring to?

A. I will point to it.

A. All I could see is the top of the tail and a little bit of the horizontal stabilizer.

Q. This area I am pointing to?

A. Yes, sir.

Q. This was sticking above the water?

A. No, not that far down, up higher. And a part of the horizontal stabilizer.

Q. I see. No other part of the aircraft was visible to you?

A. Not at that moment, no, sir.

Q. Did the aircraft ever rise again so that you saw it again?

A. No, sir.

Q. Did you search for Lieutenant Boyle?

A. Yes, sir, searching I splashed about screaming looking for him.

Q. How were you rescued?

A. Well, as providence would have it, the sky was full of helicopters that day. We had a whole squadron of 46's behind us. So as soon as the helicopter went in, basically it was a scramble for who was going to pull them out.

(p. 133) and the squadron commander of the other squadron cut off one of the aircraft and said get them, and they came down.

And they dropped what we call the horse collar, which you may have seen on TV before. The Coast Guard uses it. It drops down and comes up around the person and they take it back up. And they are hoisted into the helicopter. They dropped it down, and at first I recall kind of maybe ignoring it because I was still looking for Boyle, but then the guy came around the second time and the second time I reached out and grabbed it and hooked it up.

And as per procedures, and I was hoisted up into the helicopter.

Q. I see.

A. And taken back to the Nassau.

Q. Did you subsequently write an article in a military magazine having anything to do with this crash sequence?

A. Yes, sir, Approach Magazine.

Q. What is Approach Magazine?

A. It is a safety publication for aviation, naval aviation.

Q. What was your purpose in writing this article?

A. Basically the purpose was to more or less kind of alert people, first of all, to almost overstating the obvious, that it can happen to you. And the second thing, (p. 131) was that the importance of going through drills until things become automatic. And the third warning was, there was something unusual to our accident. Very—I have yet to talk to anyone who has known before of a pilot being sucked back into the helicopter, in my association, anyway, being sucked back into the helicopter. So this something that I thought might be good to know.

Q. Was there any intention in your article to formulate any form of criticism with regard to Lieutenant Boyle's not being able to, for whatever reason, not being able to egress?

A. No, sir.

Q. Captain, around that time period or before that did you participate in athletics?

A. Yes, sir.

Q. What type of athletics?

A. I run, I work weights a little. You know, soft ball, not exactly a jock.

Q. Okay.

Do you have any idea how much force you put on that cyclic stick to try to get it off your leg?

A. No, sir.

Q. Were you trying?

A. Yes, sir.

Q. As hard as you could?

A. Yes, sir.

(p. 135) Q. Did you know Lieutenant Boyle well?

A. As well as you might associate in four months. I was Dave's superior officer, and Dave had done a little bit of work for me. And Dave was an outgoing type of guy, just very congenial and we got along well. He was not my close friend. We had not had time to become close friends.

Q. How did he perform his military duties? Did you have an opinion about that?

A. In the time that Dave worked for me, he performed in an outstanding manner.

Q. Did he appear to perform all of his duties in this manner?

A. Yes, sir.

Q. Prior to his death, as his commanding officer or superior officer was there anything in his training that he had not received or should have, correction, that he should have received as a co-pilot for CH-53?

A. Not to my knowledge.

Q. Thank you. Nothing further at this time.

The Court: Cross examination, Mr. Booker?

Mr. Booker: Yes, sir.

Mr. Moore: There is a question, Your Honor. A question Your Honor.

A Juror: Your Honor, I would like for you to ask the Captain if it was any cargo aboard the plane, and how far are (p. 136) you away before you feel turbulence like in a race car your turbulence can throw you around.

The Court: Do you know what sort of cargo you had on it?

A. We didn't have any cargo.

The Court: You were simulating a troop pick up. So that was a dry run, you didn't pick up anybody when you went in on the Inchon?

A. No, sir.

The Court: So no cargo. The question on the turbulence escaped me.

What sort of turbulence are you talking about?

A Juror: Like following another helicopter.

The Court: Did you get that?

A. No. I know what you are talking about, sir.

The Court: In the windstream.

A. Not at all.

The Court: All right. Fine.

CROSS-EXAMINATION

By Mr. Booker:

Q. Do you recall approximately when you wrote that?

A. Yes, almost immediately upon return to New River after Solid Shield. I think about seven days after the accident.

Q. Was your memory of the accident at that time very (p. 137) vivid in your mind?

A. Yes, sir.

Q. Did you try to be as accurate and complete as you could be in that article?

A. Yes, sir, I was.

Q. And to the best of your recollection, does that article as nearly as you can recall it, fairly reflect the events that occurred that day?

A. Yes, sir.

Q. And you said that one of the reasons for writing that article was to emphasize the importance of going through drills until they became routine. Is that right?

A. Yes, sir.

Q. What kind of drills were you talking about?

A. Well, that one in particular, sir, I was referring to the emergency egress drill.

Q. And what is that drill, and why was it important for it to become routine?

A. Okay, sir. As I said, the importance in my particular case was that everything that happened to me once we impacted was automatic. I automatically went for the emergency egress handle, I sought to push the window out, I automatically released my harness. There was no second thought to any of it, there was no first thought. It was all automatic reaction, okay. We do this yearly, and what I was saying is (p. 138) what basically appears to be a pain in the neck may be important to you one day.

Q. And from what you saw of the accident, was it your view that that was not automatic in Lieutenant Boyle's case?

A. Yes, sir.

Q. Was there any explanation that came to you from anything you saw why he didn't go out his emergency escape hatch?

A. It was a question in my mind, Mr. Booker. I didn't understand why Dave didn't go out his window, no. No, I did not. I didn't understand why he didn't try to open the window in the regular manner. I didn't understand why the shield was still in place on the emergency exit handle.

Q. You mentioned that the pilot's and co-pilot's, of course, would receive emergency egress training as a part of the flight training, is that correct?

A. Yes, sir.

Q. You mentioned something I believe you called dry land training?

A. Yes, sir.

Q. What is that?

A. Basically that is not the official description of it, but when we do the drills we necessarily do them in a hangar or on the flight line or something. You don't want to do it over the water, it is expensive.

(p. 139) Q. So you would, the co-pilot would go out his escape hatch and the pilot out his escape hatch?

A. Yes, sir.

Q. People were timing you to see how long it took?

A. Yes, sir.

Q. And Lieutenant Boyle had been through that exercise?

A. Yes, sir, he he had.

Q. And where would the collective be? Would it be at various locations, as you took that?

A. It depends on, quite frankly, counselor, depends on where the collective was when he went out there. There is power to the aircraft at the time, so there is no positioning. The collective is wherever it was when you began is where the collective would be during the egress drill.

Q. So it could have been up, down, mid section anywhere?

A. Exactly.

Q. And that kind of training was repeated how frequently?

A. Well, sir, the squadron does it as they are going out on any type of ship board operation, and at the very minimum, once a year.

Q. And do you have any reason to think Lieutenant Boyle didn't get that training?

A. I know for a fact he had the training. We had the training, all pilots, a week before?

(p. 140) Q. You also mentioned there was a training as to secondary exit for the co-pilot. What is that?

A. That was a different egress drill, sir. The one he went through that I did not go through, if you recall. And the helicopter trainer in the actual water. Okay. And that egress drill was only described to me, because my own research and basically what is was they held in the windows after the co-pilot or after the pilots, if you will, demonstrated they could get out the primary egress route, which was out their window, then on the next dunking the supervisor would hold the windows in, not allow them to get out, so they had to go out the back, which was their secondary route, okay.

Q. You mentioned also that a secondary exit for a co-pilot was the pilot's window, isn't that correct?

A. That is right. That is something we only talk about, really.

Q. Not a part of regular training?

A. Not to my knowledge.

Q. And when in this, the training in the transport helicopter was that done under water?

A. Yes, sir, it was.

Q. And did Lieutenant Boyle have that training?

A. Yes, sir.

Q. According to what you understand?

(p. 141) A. Yes, sir.

Q. Did that involve an escape hatch which you had to open and then push out a window?

A. I don't know, sir.

Q. You don't know whether the window was in or out?

A. No, sir, I don't.

Q. You referred earlier today to the NATOPS manual that tells you how to operate the aircraft. Does that also contain information about emergency egress?

A. Yes, sir.

Q. And who puts out that manual?

A. It is put out by Naval Air Systems Command, sir.

Q. Have you ever participated in any input for that manual?

A. No, sir, I never attended a NATOPS conference.

Q. And the NATOPS functional check flight, check list which you also identified here today is also a Navy document, isn't it?

A. That is correct, sir.

Q. That embodies the best of Navy doctrine on how to check an aircraft and how to get out and everything, isn't that correct?

A. The best they have at the moment, yes, sir.

Q. Is changed and upgraded as you learn more, isn't it?

A. Exactly.

(p. 142) Q. And the whole purpose of going through exercises is to try to make it safer and better every time, isn't it?

A. Yes, sir.

Q. During the wave off which occurred, what did you tell Lieutenant Boyle to indicate that you were taking over control of the aircraft?

A. I said, "I have the controls."

Q. Did he know that?

A. Yes, sir.

Q. What did he say?

A. He said, "All right."

Q. He did say that?

A. Yes, sir.

Q. Did he say that before or after he said he couldn't get enough left cyclic?

A. He said that before.

Q. And so when you said earlier today that the last thing he said was he couldn't get enough left cyclic, that is the last thing he said until he said, "All right"?

A. No, no, sir. I am sorry. I misunderstood your question.

I had the controls.

Q. And he said—

A. Acknowledged I had controls, and then as I initiated the right-hand turn and we were in the right-hand turn during (p. 143) that time, he said, I can't get enough cyclic.

Q. So while you were flying the aircraft after you had taken control, he said he couldn't get enough left cyclic?

A. That is correct, sir.

Q. So that really was the last thing you heard him say?

A. That is correct, sir.

Q. And you don't know the significance of that?

Other than that he couldn't get enough left cyclic?

A. No, sir, I don't have the significance of the statement.

Q. You said when you got the aircraft you noticed that the co-pilot's stick was two inches off center?

A. Yes, sir.

Q. And you checked that the afternoon before so you wouldn't have to check it at night?

A. I pre-flighted the airplane in the afternoon so I didn't have to preflight at night.

Q. Had you flown that aircraft during a solid shield before?

A. No, sir.

Q. So this was your first flight on that aircraft during the exercise?

A. Yes, sir.

Q. Had you flown it before while it was in the squadron down at New River?

(p. 144) A. I am sure that I have, sir.

Q. But you don't have any particular recollection of it?

A. No, sir.

Q. In any event, the first time you were aware that the co-pilot's cyclic was two inches off center was the afternoon before?

A. Yes, sir, when I read about in the book.

Q. But you were assured by your crew chief and then on up the line by Quality Assurance that not to be concerned about that?

A. Yes, sir.

Q. For that reason you accepted that and you weren't concerned?

A. My concern was put in abeyance.

Q. You were concerned, but your concerns were mollified?

A. Yes, sir.

Q. What makes you think that it was the co-pilot's stick which was two inches off center to the left rather than your stick not being two inches off center to the right?

A. That is very good. The reason I know my stick was centered up is because as the aircraft was turning, when I had my stick centered, the rotor tip path plane was straight. If my stick was amiss, canted, then it would be canted one way or the other and I could see that. That is one of the things you check during the controls checks. You want to (p. 145) make sure the tip path plane is turning the way you want it to with the stick. When I was centered up, the tip path plane was centered up.

Q. And so actually if Lieutenant Boyle had been holding his stick where it should be right in the middle, then yours would have been two inches to the right?

A. Yes, sir, if he moved his stick probably right to the middle, and once again, you know, we are going on logic here, I don't recall, okay, Dave, put your stick in the middle, I want to see how far the tip path goes to the right, but that is logically correct.

Q. Putting two and two together and being able to see the tip path, and that really is the end of the blade, isn't it?

A. Yes, sir.

Q. You could tell it was his stick rather than yours that was off center?

A. Yes, sir.

Q. And you had checked the throw, had you not, the day before?

A. No, sir. No.

Q. You had not checked to see how far it would go in each direction?

A. That is true, I did not.

Q. You never did that?

A. No, I did it the day we flew as we were starting up, (p. 146) but the day before I did not, no, sir.

Q. So you had flown it when you had the night flight. Did you check the throw?

A. Yes, sir.

Q. Before you took off?

A. Yes, sir.

The Court: You mean morning before.

Q. I should say the flight during dark hours?

The Court: You call that morning. Some of the jurors may be country people, and 4:00 o'clock is just normal morning time. Plus myself.

Q. Yes, sir. But in any event, you had checked it before that. You had two flights that day, and you checked it before the first one?

A. Yes, sir.

Q. I have the sequence right now?

A. Yes, sir.

Q. Did you check it before the second one?

A. Yes, sir.

Q. And you had—your stick would move all the way from one stop to the other, is that correct?

A. Yes, sir.

Q. And did you sit in the co-pilot's seat to move the stick?

A. No, sir, I did not.

(p. 147) Q. Was Lieutenant Boyle sitting in the co-pilot seat when you were checking yours from right to left?

A. Yes, sir. And incidentally, in case there is a question, Dave also had full throw.

Q. So his would travel the full 8.9 inches?

A. Yes, sir.

Q. But if the minute you moved yours as far as you could go, that would mean that his was two inches further than it normally would go?

A. Yes, sir.

Q. All right. And are they right—is the stick right between your legs?

A. Yes, sir.

Q. And so as you go as far as you can go, I believe you said that when it came all the way to your side it pinned your leg up against the side of the aircraft?

A. That is correct.

Q. So if it went all the way the other way, it obviously would pin Lieutenant Boyle's leg?

A. Yes, sir.

Q. Because the seats are basically the same size?

A. Yes, sir.

Q. The aircraft is symmetrical?

A. Yes, sir.

Q. Do you wear a knee pad when you fly?

(p. 148) A. No, sir. Well, I wear a knee board, is that what you are talking about?

Q. What is a knee board?

A. A knee board is basically—it is like a small clip board that you strap to your leg so that you can write down instructions that you receive during the course of the hop or gripes that you might have, or anything else you would like to write down.

Q. And does the co-pilot wear a knee board?

A. Yes, sir.

Q. Which knee do you wear it on?

A. I wear mine on my right. Okay, If the co-pilot is left-handed and he wants to write, then he would wear his on his left.

Q. I see.

And so when the stick was up against your leg, it was also up against your knee board, wasn't it?

A. If my knee board was down that low to where the stick was hitting it, yes, sir, I suppose.

Q. So you don't have any recollection one way or the other?

A. I don't recall one way or the other.

Q. The stick was up against your leg, and you had a knee board on your leg?

A. Yes, sir.

(p. 149) The Court: That is summarizing what he has testified to. I don't permit that even in direct or cross.

Q. And then at some point, though, your leg was free of the stick, wasn't it, because you got out?

A. Yes, sir.

Q. And do you have any recollection as to the point at which the controls freed up enough so that you weren't—your leg wasn't pinned by the stick?

A. None whatsoever, counselor.

Q. In any event, it had occurred before you got out of the aircraft, had it not?

A. I don't know, sir. I may have been able to pick up that leg. I am not saying it was pinned in such a manner that there is no space for me to get that leg out. There were no bruises, so,—it may have gone back, but I do not ever recall the stick going back.

Q. You said that the minute you hit the water, or the second you hit the water, really, the generators went off.

A. No, sir. What I said was, as soon as the rotors stopped turning enough the generators of course are going to die off because the rotor turning the main transmission which is supplying the power that goes into the generators which runs all of the associated equipment with the 53. When we hit, very shortly after that, of course, the rotor engine is trying to stop because they are breaking off in the back, and (p. 150) the engines will stop and everything else. I was almost parenthetically surprised I could hear myself talk on the I. C. S. after we hit the water.

Q. And that meant that there was at least some juice still aboard?

A. Apparently.

Q. After that did the lights in the cockpit go out and everything?

A. It was day light.

Q. You didn't have any lights on?

A. No, sir.

Q. But the rotors stopped for sure, you remember?

A. Yes, sir, because when you hit in the 53, if you have ever got to put it into the water at all you want to roll it right so that the rotor blades which are turning in a counter clockwise fashion break off behind you, because if you roll it left and they break off in front of you there is a tendency for them to come through the cockpit and severally injure the pilot.

Q. None of that happened, did it?

A. No, sir.

Q. So to the extent that you could think at all about how you wanted to impact, you wanted to impact on your side?

A. If I wanted it to impact, that is the way I would want it to go, yes, sir.

(p. 151) Q. In fact, you thought you might be able to pull it out, didn't you?

A. It was my fondest desire at the moment, yes, sir.

Q. And you had full—you weren't trying to land it in the water for an emergency landing in the water, were you?

A. No, sir, I was trying to make for a level impact.

Q. And you were giving it all the power you could?

A. Pulling all I had yes, sir.

Q. You have a gauge that is called a torque gauge, is is in front of you, don't you?

A. Yes, sir. Didn't see it.

Q. You don't remember what that said?

A. I was outside of the cockpit, sir. I was looking all of my attention was to the sea coming up at me.

Q. As far as you know you were giving it all the power it could take, it was taking all you could give?

A. I was pulling all the collective that I could get.

Q. You estimated the speed at which you flew was 45 to 55 knots?

A. No, sir. I don't know how fast I hit. I know that at the time that the emergency initiated the last air speed that I saw was 45 to 55 knots. On short final to the L. P. D. I don't know how fast we had.

Q. Do you have any perception whether you slowed up a great deal or speeded up a great deal?

(p. 152) A. Things were going awfully fast. I don't know. I don't know.

My educated guess, of course, would be that we slowed up because we pulled in all the collective. We raise the nose, which is the way to slow up a helicopter. So, yes, in retrospect, we had to have slowed up.

Q. But in any event you were giving it all the power you could give it?

A. Yes, sir.

Q. And it is your judgment that you descended from about 200 feet to the water in about five seconds?

A. That is my judgment, yes, sir.

Q. That would be a drop of about 40 feet a second?

A. I don't know, sir.

Q. Well, 200 divided by 5?

A. Okay.

Q. About 40 feet a second?

A. All right.

Q. It took you longer, or if you were higher then the answer would be different?

A. Yes, sir.

Q. In order to get your window out—well, Your Honor, may I use an exhibit, with the witness?

The Court: Certainly.

Q. I show you an exhibit that has been marked for (p. 153) Sikorsky as Defendant's Exhibit 22. I realize this is the co-pilot's side, but do you recognize that?

A. I recognize it as being a CH-53 window, yes, sir.

Q. And except for the fact this is on the co-pilot's side, it is a mirror image of the one that you pushed out, isn't it?

A. Yes, sir.

Q. And it is obviously whatever weight it takes to lift it?

A. Yes, sir.

Q. When you pushed yours out you said you could see about four inches of light?

A. Yes, sir.

Q. That would be down to about a line say four inches down not from the top of the window but the top of the plexiglass?

A. Yes, sir.

Q. The rest of this was under water?

A. That I saw at that moment as I was reaching for the handle, yes, sir.

Q. This is not hinged in anyway at the top, is it?

A. I don't believe so.

Q. Has these two little pins, and once you push it out on the bottom it drops down, doesn't it?

A. Yes, sir.

(p. 154) Q. In all of the times that you had training on dry land with this it would drop right on out as soon as you would hit.

A. Yes, sir, never had any trouble getting it out.

Q. You pushed, and away it went?

A. Yes, sir. Push and away it went. It doesn't like fall out.

Q. No, the mere pulling of the level does not propel it out, does it?

A. No, sir.

Q. It requires two acts on the part of the pilot?

A. Yes, sir.

Q. He must first pull it out, and then he pushes it out?

A. Yes, sir.

Q. And that is what you use this for, isn't it?

A. Yes, sir.

Q. Right.

Now, if Your Honor please, may I use Exhibit 33 with the witness?

The Court: Very well.

Q. May I again approach the jury?

The Court: Yes, sir. Stand over in front of the jury, Captain.

Come around in front of the camera, if you will.

Move in between the reporter and the camera, if you (p. 155) will.

Q. All right.

Now, assume for the moment that it is all agreed that this is a picture of the aircraft involved.

A. All right.

Q. And as you may see you can observe what appears to be damage on it.

Now, is this the escape hatch knob?

A. Yes, sir.

Q. And is this the collective with the red button at the top?

A. Yes, sir.

Q. And do you recognize this as armor plating on the seat? Or this is armor plating on the seat?

A. Yes, sir.

Q. Here is the window itself, is it not?

A. Yes, sir.

Q. The handle we just looked at starts about at that rivet, doesn't it?

A. Yes, sir.

Q. And works it way back. Could you estimate how far it is from this seat to that window?

A. I would directly estimate, I would say eight to ten inches maybe.

Q. That is just a short reach across?

(p. 156) A. A matter of—yes, sir.

Q. Really sort of straight across, isn't it?

A. Yes, sir.

Q. So it is not a question of bending backward or anything like that?

A. Well, that depends, too, on where the seat is positioned. As you know the—

Q. It moves back and forth?

A. Yes, sir.

Q. Depends on the height of the pilot?

A. And the length of his legs.

Q. And the way you were sitting, you pretty well had a straight shot at it?

A. No. As a matter of fact, because of the length of my legs, I was a little bit—so I am kind of doing this.

Q. Was Lieutenant Boyle taller than you?

A. Yes, sir.

Q. His seat logically would have been back a little bit?

A. A little bit, yes, sir.

Q. Thank you.

Was there anything amiss at any time on this flight with the number one auxiliary fuel gauge that you remember?

A. No, sir.

Q. It functioned perfectly all right?

A. Yes, sir.

(p. 157) Q. And so it was only the number two auxiliary fuel gauge that was any problem?

A. As I recall, yes, sir.

Q. Is there anyway that a pilot on this aircraft can visually check the fuel level in the auxiliary tanks?

A. No, sir.

Q. Is there any—

A. Now, I mean physically visually view the tank or talking about checking against the gauges?

Q. I mean visually open up the tank and stick your finger in it?

A. No, sir.

(p. 160) Q. Now, I would like to, if Your Honor please, could we look at the photographs put up by the counsel for the plaintiff?

I think we can look at them.

The Court: You may stand down, captain, so you can get a better look at them.

A. All right, sir.

Q. You have already identified this, I believe, as your side of the aircraft?

A. Yes, sir.

Q. And the window is distorted because of the rescue operation and not because of anything that happened, because as you recall it the window was in tact?

Or the area?

A. Yes, sir.

Q. But you recalled distinctly this little chin bubble (p. 161) was broken?

A. Yes, sir, that is where the water was coming through.

Q. You also mentioned this was broken?

A. Yes, sir.

Q. What do you call that?

A. The lower windshield.

Q. Now, that actually was not broken on the co-pilot's side, was it?

A. No, sir.

Q. Do you remember whether the chin bubble was?

A. No, sir, I don't know.

Q. But the water was definitely coming in on your side for sure?

A. Yes, sir.

Q. You weren't in a position to tell whether it was coming in the other side or not?

A. No, sir.

Q. This next photograph shows the co-pilot's side, doesn't it?

A. Yes, sir.

Q. And can you tell from looking whether it looks as if that is broken?

A. I really can't tell from that picture, sir.

Q. All right.

Now, this next one, do you recognize that at all? Is (p. 162) this from the accident aircraft?

A. No, sir, as a matter of fact, Mr. Franecke showed me this one before. This is from pictures that he took of a CH-53 on the flight line in Alameda.

Q. That is 53 A. or D.?

A. I don't know. He didn't say, sir.

Q. But in any event, it is not the same aircraft?

A. No, sir.

Q. As far as you know, not even the same class of aircraft?

A. Well, Alpha or Delta is not substantial different.

Q. What is this right here?

A. What that is, this is a little vent window that we have. Okay.

And we had that on the other ones as well. All you can use it for is by turning it you open up the vent and you have ram air effect to provide a little cooling.

Q. This is not the accident aircraft, in any event?

A. No, sir.

Q. All right.

And this next photograph?

A. Is also not the accident aircraft.

Q. Is not?

A. No.

Q. There was a posed picture?

(p. 163) A. Yes, sir.

Q. Taken—

Mr. Franecke: Objection, Your Honor. Argument.

The Court: The objection is overruled.

Q. And this was taken where, at Alameda?

A. That is what Mr. Franecke—

Q. That is what you were told?

A. Yes.

Q. Where is that?

A. California.

Q. Was this a Marine or Navy?

A. Marine Reserve.

Q. Marine Reserve?

A. Yes, sir.

Q. All right. Thank you.

Do you know anything about how the windows in the rear of the aircraft go or act in an emergency? Are they equipped like the ones up in the co-pilot and pilots' area?

A. Well, okay, let's talk a little bit about the different windows. You have the gunner's window, as you know, on the left-hand side, which is normally the one if you have a first mate he is stationed in. The crew chief's door and window on the right-hand side, which opens up. The crew chief's window opens up and latches up if he so desires, and the door itself folds out so that you can step up.

(p. 164) The gunner's window, as you know, sir, unlocks, and it can be pushed either out or in either way. You can pull in the gunner's window, as is often done so that they can have the cooling effect in the back. They may even take the window out and secure it in the helicopter so they can travel like that.

Q. And on that particular day was the gunner's door up and latched?

A. I don't know, sir.

I don't recall.

Q. What is the standard procedure?

A. Okay. The standard procedure for that day, if I was to say it was in the spring time, it was Virginia Beach, I would say the gunner's window was out and the crew chief's window was up and latched.

Q. And so those two exits would have been readily available to get out of?

A. That is correct, sir.

Q. And indeed the two people who were in that part one way or the other did get out?

A. Yes, sir.

Q. Were they, do you know whether when you first hit the surface the first time, were they already up on the surface?

A. I didn't spy them the first time, but I wasn't up long.

(p. 165) Q. On the day before when you were measuring the throw you said that there were times when one would use a fish scale. On this particular occasion did you actually measure anything, or did it just look and feel normal to you?

A. It looked and felt normal to me on the day of the flight. Once again, the day before all I did was free flight. There was no power to it, so I did no controls check.

* * *

Q. You said it would take, with the servos off it would take about 7.5 pounds more or less to move the cyclic one way or the other?

A. That is the measurement.

Q. And with them on, about 14 ounces. So very little pressure to move them?

A. Right.

Q. Even 7.5 is well within your strength capabilities?

A. Yes, sir.

Q. And do you know whether there is a shear pin on the AFCS system which will give way in the event you wish to over-ride it?

A. I have heard of the shear pin, sir. But I don't (p. 166) possess a whole lot of knowledge on it.

Q. You don't know what its function is or what happened to the shear pin in this accident?

A. Well, a shear pin by its nature is supposed to shear if something goes wrong. I assume that is the function.

A. Yes, sir.

Q. What controls were you available to you, had you wanted to disconnect the AFCS system and had you had the time, or if you thought about it?

A. Had I had the time, sir, and I could have reached over and punched out the number one and number two AFCS servos and then see if the problem was strictly in the AFCS unit, then I could have brought the thing back a right if that indeed was the problem. Now, it is as I pointed out with my first testimony to the other counselor, at that time the initiation of the problem I would be perfectly honest, I did not say, gosh, it feels like an AFCS over-ride and we are heading for the water. There wasn't that type of time, so I really because of altitude and air speed and the immediate proximity of the objects, there was very little time for analysis.

Q. How high off the surface is the deck of the carrier you were going to land on?

A. Sir, I think it is under normal conditions, I think that was about 50 feet, the L. P. D. I believe the L. P. H. is something like 75 feet, and the L. H. A. is a little (p. 167) higher than that.

Q. So your glide pattern would have brought you from 200 feet then down to about 50 feet?

A. Yes, sir, approximately.

Q. So your best recollection is that you were at 200 feet when you began your turn after the wave off?

A. Yes, sir.

Q. Thank you. No further questions, Your Honor.

The Court: Any redirect?

Mr. Franecke: Yes, Your Honor.

The Court: Counsel, before you engage in redirect, I must say, I am a strict constructionist. I only permit you to ask questions on new matters that have been brought up by Mr. Booker's. I don't let you ping pong the witness back and forth to get in the last word.

Frankly, I can't think of anything new that he brought out that exceeded the scope of your direct, but come up to the lectern and let's hear any redirect that you may be bold enough to attempt.

Mr. Franecke: I will give it a try.

REDIRECT EXAMINATION

By Mr. Franecke:

Q. Referring again to one of the other photographs or exhibit 2 which Mr. Booker had asked you to look at, the other ones, does this photograph show the subject aircraft?

(p. 168) A. Yes, sir.

Q. And can you tell by looking at that photograph whether the co-pilot's chin bubble is in fact broken away?

A. That one, yes, sir, you can because you can see the glass. If I might point it out, Your Honor.

Mr. Moore: May I approach the jury?

The Court: They can see it from where it is. Come around and stick your finger on it.

A. You can see right here where the glasses edge is. See that where it appears to be a little more glazed?

Q. That is fine. You may step back in the witness box.

Captain, there was something that Mr. Booker brought up that I would like to clarify.

When you pull the escape handle on either the pilot or co-pilot's side, does the window pop out?

A. It would depend exactly upon the position of the aircraft. Because, all of what that does when you pull that handle is it pulls in some little pins on the bottom. If the aircraft is perfectly up right, it is not going to fall out. If it is canted, it might fall out. If there is water against the aircraft, you are going to have to push it out. But what we instruct is you pull the pin and push out the window and it goes.

Q. Referring to defendant's exhibit number 2, I note there are pins at the top.

(p. 169) A. Those are strictly for alignment and to hold it in. The ones that disconnect are, I believe, on the bottom and the side.

Q. Is this what you are referring to, looking at the bottom of the exhibit?

A. I suppose, so, sir. I really don't—never much studied it.

Q. The point of my questions is, however, is it necessary to hold the escape handle up at the same time that you have to then push the window out?

A. No, absolutely not.

Q. You only have to pull. One, pull the handle up, leave it there and then push out?

A. That is correct.

Q. All right.

* * *

(p. 170) Q. Would you please state your name?

A. Charles F. Tubbs, Staff Sergeant, United States Marine Corps.

(p. 171) Q. Presently employed by the U.S. Marine corps?

A. Yes.

Q. On 27 April 1983 were you also employed by the U.S. Marine Corps?

A. Yes, I was.

The Court: You are a staff sergeant, Sergeant Tubbs?

A. Yes, Your Honor. Yes, I am a staff sergeant.

The Court: Thank you.

Q. And 27 April, in and around that time period of 1983 did you have any particular duties or responsibilities in the U.S. Marine Corps?

A. Yes, I did. I was a crew chief on a CH-53 helicopter.

Q. Were you—we already know something about what a crew chief does, but can you tell us specifically what is the job of a crew chief on a CH-53 helicopter?

A. The crew chief's job is that we preflight, post flight, maintain and have responsibility for, am assigned a specific aircraft to maintain for a certain length of time.

Q. And had you been assigned in and around April of '83 to a specific aircraft?

A. Yes.

Q. Which aircraft was that?

A. Helicopter 07, 157151 the one that crashed off the Atlantic beach.

Q. How long had you been assigned to that aircraft?

(p. 172) A. Well, I was assigned to it in July of '82 to October of '82, then reassigned in February of '83 until the time of the crash.

Q. Until the time of the crash? I am sorry, I didn't hear you.

A. To the time of the crash.

Q. I see. All right. As a part of your function as crew chief is it also part of it that you will in fact do various forms of maintenance to the aircraft?

A. Yes.

Q. Does that maintenance include various parts of the control systems?

A. Yes, we do a lot of removing and replacing of the flight control system components and we assist other shops in different areas.

Q. All right. Would this include the removal or re-installation of the AFCS servos.

A. We assist the hydraulics shops in changing those components.

Q. Are you familiar with the procedures that are employed in either the removal or in the installation of the AFCS servos?

A. Yes, I am familiar with them.

* * *

(p. 174) Q. Okay. Now, Sergeant Tubbs, to your knowledge did you have any problem from July of 1982 until October of 1982 with the roll AFCS servo unit?

A. Yes, we did.

Q. What was the difficulty with the servo unit?

A. All right. The difficulty with the servo unit, there was a stiffness in the lateral movement of the control sticks.

Q. Do you know what was causing that stiffness?

A. I know they come out with a modification to change or add to the servo itself. I can't exactly name it. But they were supposed to put a fix in there to—on the power piston itself to eliminate the stiffness or the O-ring from rolling on the power piston itself.

* * *

(p. 177) Q. . . . Can you just describe for the jury, Sergeant Tubbs, what do you mean by a piston? What does it do?

A. All right. You have got your control inputs that come in from this side here.

And it is more or less hydraulically actuated. Hydraulic pressure running through it at 15 hundred P. S. I., more or less like automatic flight control system. And

it is set up for memory and assists in the movement of the controls where it doesn't take that much force.

Q. Does this piston move back and forth?

A. Yes, sir.

Q. Somewhat in that manner, is that the idea?

The Court: What actuates it to get there.

A. Hydraulic pressure and electrical hydraulic—

The Court: You have to pull some lever or push something?

A. It is automatic in the flight control system. It is coordinated with the cyclic stick.

The Court: If you move the cyclic stick, that energizes these power pistons or the—

A. Well, you have got an electrical. You have got the AFCS control box which is in the center of the aircraft. Your servos move with the movement of the cyclic stick. It makes it a lot easier. The servo, which activates AFCS's.

. . .

(p. 180) It was your understanding that sometime in and around the summer or fall of 1982 there was a fix to this power piston that was required?

A. Right.

Q. Is that correct?

A. That is correct.

Q. All right. And what was your understanding was necessary to fix the power piston?

A. They removed the servo from the aircraft and sent it off for rework. And they take it apart, which we are not authorized to, and I have not seen one taken apart.

And they removed the piston, put the fix in it, and then they will re-issue it back into the supply system.

Q. As long as we are here, I wish to kind of jump ahead and then go back to something else. You assisted and or have seen these servos installed in the aircraft, have you not?

A. Yes, I have.

Q. All right. Can you show the members of the jury where the hydraulic lines are actually attached to the servo?

A. Two of them go right here, and two of them goes right here on both sides. They are capped off, and they are capped upon receiving the servo in from the supply system.

The Court: That are flex lines or rigid lines, or (p. 181) what?

A. Rigid lines.

. . .

Q. All right. Now as a part of, and keeping this in mind, as a part of the—as a part of the overall workings of the servo is there anywhere else that hydraulic fluid comes in or goes out of that servo other than the two holes that you have pointed out?

A. No.

(p. 182) Q. Is there any direct connection of hydraulic fluid to the moog valves themselves other than through these two openings that we have just pointed out?

A. Well, internally there is. But, I have never changed a moog valve. I mean, I have did hydraulics, and they have set it up and tso'ed it. I have—the timing of the servos, when you change from one system to another, you don't have no to large jump.

Q. Is there any reason why you as a crew chief sargeant have not changed the moog valves?

A. That is not our assigned function, sir.

Q. You are not allowed to do that?

A. Right.

Q. Do you know whether or not other components of the Marine Corps are allowed to do that?

A. Just the hydraulics.

Q. Just the hydraulics man, all right. Also in looking at this one, for example, is there some type of way you can tell whether or not a moog valve has been removed or not removed, either a paint or something of that nature?

A. I know like when the squadron changes them they usually safety wire them. We use a torque stripe, a green colored enamel paint that we put on the bolts.

Q. What do you mean by that?

Can you describe that?

(p. 183) A. Okay. On the servo here, the bolts. The four mounting bolts. This one has been removed. We check these here for torque and usually put a stripe of paint right here on the side. And then it is safety wired with 20

thousandths safety wire, which is safety wired from here to here and from here to here. The same on the other side.

Q. That tells you whether or not this moog valve has been removed or not been removed, is that correct?

A. I don't understand the question.

Q. Well, it will tell you whether or not this screw has in fact been broken or unscrewed?

The Court: After he has painted it and—

Q. After he has painted it and safety wired?

The Court: He doesn't do that until after it has been removed, do you.

A. Right. It has to be removed and changed, first, and then that is our procedure.

* * *

(p. 184) Q. Now, sir, has a part of the your responsibilities regarding this type of CH-53 aircraft, are there means by which you or people that you work with check to see whether or not the hydraulic system has got any foreign material in it?

A. Yes, we do. We do a patch test on the systems when there is a component charge or a break in the system. And in a phase cycle we do a particle count.

(p. 185) Q. All right. Let's talk about that a second. What do you mean by a patch test?

A. A patch test is a kit for sampling the hydraulic fluid which goes through a real fine filter. And we check the freon, the freon in the hydraulic fluid are mixed in,

sucked through this small white filter. And there is a book that goes or a manual that goes with this, a small little manual that gives you certain colors that will tell you if it is class one or class three or class five.

Q. Okay.

A. Th darker it gets, the more dirty the system is.

Q. And what class is it that an aircraft is not supposed to fly under?

If you find in the patch test that particular class?

A. Class five.

Q. Class five.

Anything below class five is it all right to fly the aircraft?

A. Class one and three, right, yes you can still fly the aircraft.

Q. How often, as a crew chief, do you make sure that a patch test is done on the hydraulic systems of the aircraft to see whether or not there is anything foreign in there?

A. It depends on the crew chief itself. Because, the crew chief does not have to maintain the patch test, because (p. 186) the hydraulics man does the patch test. But for myself, I always do follow up on my aircraft to make sure that everything is being worked on properly, to make sure that my aircraft has been maintained all right.

Q. Okay. And you are referring of course to the aircraft that crashed, among others?

A. Right.

Q. Where are the fluids taken from the hydraulic system in order to do the patch test?

A. Taken from the reservoirs.

Q. The reservoirs. Do you mean the reservoirs that may be in that servo?

A. No. It is in the same compartment area, but the main servicing reservoirs are on top and just aft of the sliding dog house. Three round large cylinders.

Q. Sit up somewhere away from the servo?

A. Right. They are not attached to the servo.

Q. I see.

And that is where the sampling is taken, is that correct?

A. Right.

Q. Okay.

Now, was such a patch test performed on the aircraft that crashed sometime prior to the crash?

A. Yes, it was.

(p. 187) Q. Do you know when the last patch test was taken to determine what the hydraulic system looked like on the aircraft that crashed?

A. It was about a week before the airplane crashed.

. . .

Q. Sargeant Tubbs, what is enclosure 37?

A. Particle count done by contamination test center.

Q. What aircraft was this particle patch test done on?

(p. 188) A. It was done on my aircraft.

Q. That means the aircraft that crashed?

A. Yes.

Q. This was done on what date?

A. 21 of April of '83.

Q. That is about a week before the crash, is that correct?

A. Yes, it was.

Q. How did the patch test come out?

A. Patch test came out good.

Q. Any problems with it that you see there?

A. No.

Q. Had there been any problems with the aircraft around that time period that you as its crew chief made note of regarding the hydraulic system?

A. You mean up to the day of the crash?

Q. Up to the date of the crash.

A. Well, the only problem that we had with any of the hydraulic systems was the utility system, which was one thing, the start system itself had a leak the day of the crash, and we had the hydraulics up there. They changed some fittings, pressured it up and we checked it out, and that is the only leak that it had on the aircraft out of the valves and up to the time of the crash.

Q. When you say you had it serviced, what do you mean by serviced?

(p. 189) A. They used a hand-carried servicing unit, and when the systems get low on fluid, they serviced up with that unit.

Q. You say serviced, do you mean you pump more fluid into the system?

A. Yes.

Q. Is there a test then performed to see whether or not there are any contaminants in the system after you pump in the new fluid?

A. Yes, there is. They do a patch test on it, and they are supposed to be doing a patch test on it every morning prior to that servicing unit going out to any aircraft.

Q. I see.

Do you recall whether or not on your aircraft, the one that crashed, for the several days before the crash whether or not there had been patch tests performed on the hydraulic system?

A. You mean prior to this particle test?

Q. No, after this particle test that we have referred to in Exhibit One.

A. If it was another patch test done on the aircraft?

Q. Yes.

A. Not to my knowledge.

Q. Was there any other kind of test done after 21 April 1983 on the aircraft that crashed to determine what the condition of the hydraulic system was?

(p. 190) A. No.

Q. Was this normal standard procedure for you to spend or take from 21 April until 27 April to take a patch test of the aircraft?

Mr. Booker: Object, Your Honor. There is no testimony there was a patch test on 27th of April.

A. That is correct.

Q. The implication, of course, being that was the time—

The Court: Ask him what the frequency of the patch test is.

Q. What was the frequency of the patch test for this type of a helicopter?

A. Any time the patch test was performed on the aircraft is on a component change and/or if you take a line off and have to replace the line, we then do a patch test on that system.

Q. All right. And were there any component changes from 21 April 1983 until the day of the crash?

A. No, not on the hydraulic system.

The Court: Sargeant, as I understand it, though, while you get different pilots and co-pilots, you as crew chief stay with that aircraft?

A. Yes.

The Court: All right.

Q. Now, Sargeant, go to the day of the crash itself.

(p. 191) Did you check the aircraft before the first flight in the morning, early in the morning?

A. Yes, we did.

Q. Did you find anything that you in your function as crew chief found to be amiss or wrong with the aircraft?

A. No, not to my knowledge.

Q. Was there anything having to do with the co-pilot's cyclic stick being off center two inches or so?

A. I think you are referring to the time of the exercise before going aboard ship. Since we were both out on both exercises, or just prior to it going in phase, there was a displacement in the two sticks. The cyclic stick nut itself was loose. It have to have a proper washer installed and retorqued.

Q. Okay.

A. The alignment has got a pin that goes through the cyclic stick itself there was a little bit elongated.

Q. All right.

Where is that located?

A. The cyclic stick?

Q. What you had to change to with regard to this cyclic stick.

A. It is in the co-pilot's side to the—would be the left-hand avionics compartment right below the or in front of and below, because the cyclic stick comes in and around the (p. 192) co-pilot's seat.

Q. Okay. Had that been—well, had that been fixed on the day of the crash?

A. I can't remember if that was or wasn't.

Q. Okay. Was there anything wrong with any of the fuel gauges that was your responsibility to determine prior to the crash flight?

A. We had one faulty gauge.

The Court: Counsel, since this was covered is he going to say more, or is it cumulative and a total waste of our time?

Q. I am sorry.

The Court: Move onto something that is new and that will be helpful to the jury.

Q. Sargeant, on the day—at the crash sequence where were you riding prior to the crash on the fatal flight?

A. I was in the crew chief's side area, which is right behind the the pilots.

Q. Now, if I may point out again using the model, is this the area in which you were seated inside the cabin?

A. Right.

Q. And that was right behind the pilot?

A. Right.

Q. Were you wearing any form of ear phones or something like that so you could listen in?

(p. 193) A. Yes, we do. In all flights we are hooked up with the helmet, a long cord and into the I. C. S. system.

Q. Were you strapped in in anyway while you were near this crew door?

A. No, I was not.

Q. What position was the crew door in?

In other words, was it open, closed or what?

A. The lower half was closed, the upper half was open.

Q. Which way does the upper half of the crew door swing?

A. It swings inward.

Q. Inward and up?

A. Inward and up and locks into there.

Q. Okay.

What were you doing just prior to knowing that there might be something wrong.

A. Well, I knew we were going to go in for a carrier landing. And when they initiated the wave off, and myself as being in the back, I am observer and I point out different aircraft in the o'clock position.

Q. Meaning what?

A. The nose of the aircraft is 12:00 o'clock.

Q. Okay.

A. So any aircraft that goes from the one to 11:00, aircraft the pilot has a visual reference at. We try to maintain coordination with the pilot. If we see an aircraft (p. 194) at 3:00 o'clock, that is directly off the side, we notify the pilot there is a 46 out there, or a huey out there. And he will glance over at it, see it and make sure

we have air all the way around so we don't run into different aircraft.

Q. I see.

What was your first indication there might be something going wrong?

A. I heard the co-pilot say something about not enough left cyclic, that he had problems with it.

Q. Were you already in the turn at that point?

A. Yes, we were.

Q. How long did it take you, if you can give us an estimation, to actually impact the water once you knew something was going wrong?

A. I can only guess at it. I say three to five seconds. It happened very rapidly, very quick.

Q. Okay.

A. I remember giving a clear right except for 46's, and there are 2:00 to 3:00 o'clock a group of them over there. And right after that we were in the water. I seen the water coming up, and I just was right in the—right in it on impact.

Q. What happened to you when the aircraft impacted, when it hit the water?

A. Oh, the only thing I can remember seeing was the water (p. 195) coming up. I heard the increase in rpm and then somehow I was on the left side around the first window with everything dark. And the inside, all I seen looked like they had a hole with light in it and that was it.

I was out. I don't remember swimming out or how I got out. My first mate told me that I swam out. Which I don't have memory of.

A. I see. Did you then climb up on some portion of the wreckage?

A. Yes, I did.

Q. What portion of the wreckage did you actually climb up on?

A. It was the tip tank.

Q. Now, we understand what the bullet-like tip tank is, was it the right-hand sponson and tip tank that you climbed up on?

A. Yes, it was, but there was no way of identifying it because that was the only one that was floating in the water.

Q. Floating in the water. Was the aircraft by the time you got to the tip tank, was it still on the surface of the water or had it already sunk down below the top of the aircraft?

A. When I got on the tip tank, I did not see the aircraft.

Q. Did you look for it?

A. I don't remember specifically looking around to see if (p. 196) I seen the aircraft. Everything was so quick, I was stunned. I know when I got on the tip tank I inflated my vest and I got back in the water because a 46 come by. And I heard Captain Tussing hollering for the co-pilot. And that—that is when I first comprehended

there was one body still down there. And the recovery time, I mean it seemed like we were picked up very rapidly, because when the 46 came by I remember a 46 picking up Captain Tussing and finally the 46 flying over, there was fuel being blown all over the place, because I got it up underneath my visor and in my eyes, and I was covered with it. So I was actually, to me my body felt like was burning until I get the fuel rinsed off.

Q. When the aircraft had impacted, were you thrown off your feet?

A. Yes, I was.

Q. Which way were you thrown?

A. I was thrown to the left side of the aircraft.

Q. Very well.

Did water come in through the back of the aircraft to your knowledge?

A. I don't know.

Q. Do you know whether the rear half of the aircraft was broken a way at the impact?

A. No, I don't. I—I was told what had happened, but as far as actually seeing it, I did not.

(p. 197) Q. Sargeant Tubbs, let's go back to one of the questions a juror asked you.

If the stick wouldn't work because of something in the servo system, there could be a mechanical problem or a hydraulic problem or electric problem, any of those three.

A. Right.

Q. Would keep the stick from working?

A. Right.

Q. But if the hydraulic system was working on the aircraft, and there was a hydraulic problem, you could switch to another hydraulic channel, couldn't you?

A. Right.

Q. And so if the collective still worked on this aircraft, that meant the hydraulic system was working, didn't it?

A. Pertaining to the—well, see the collective—all right. To my knowledge, all right, I mean the servo for the collective is independent of roll, but they still are powered by the same hydraulic system.

Q. That's right. So if the collective system is working on the aircraft, that means that there is still hydraulic (p. 198) power on the aircraft, doesn't it?

A. Yes.

Q. And so if there were a hydraulic problem with the servo, you could switch to another channel, and because the hydraulic system is still working you could still work the stick, couldn't you?

A. Pertaining to the roll servo?

Q. Yes.

A. Well, it depends if like you were saying if it was mechanical, hydraulic or electric. If it is mechanical, I don't think you would be able to switch it over to another system.

Q. Mechanical is if somebody dropped a screw driver in between the control system, wouldn't it?

A. Yes.

Q. But assuming that there were something that had gone wrong with the hydraulic system just on the AFCS

portion of the roll servo, you could then switch to another channel, or it would automatically switch to another channel?

A. No, you would have to select another channel.

Q. You have got that right there on the console, haven't you?

A. Yes.

Q. And also even if there were some problem, you can override the automatic flight control system with the stick, (p. 199) can't you?

A. Right. You can override the hard-over. Is the flight director they take out where you have an electrical problem giving you a indication of a hard-over, you can override the electrical portion of it?

Q. And we saw a chart earlier today which said that it took about 14 ounces of power to control the hydraulic system with the AFCS on, does that sound right to you? Have you seen that kind of chart?

A. 14 ounces, that is about right. It is not very much pressure at all to move the cyclic.

Q. But then if for some reason the AFCS system is off it takes 7.5 pounds pressure?

A. That is what your max allowed.

Q. Right. Did you check out those controls yourself the day of the flight?

A. The day of the flight, no.

Q. Did you check them the day before?

A. No.

Q. Did they appear to function as far as you you were concerned? Did Captain Tussing make any complaint

to you that they weren't functioning right when he checked them?

A. Not to my knowledge.

Q. And if they had not been working right, and the captain had noticed that, whom should he have notified about (p. 200) it?

A. If he has a discrepancy with the aircraft, he notifies me and then we do—he doesn't have to notify myself as the crew chief, but goes to maintenance control department and then writes up an MAF initiating discrepancy that he has found, and then maintenance control would distribute the discrepancies to the various shops to be dealt with if it was—if it was an up discrepancy or down.

Q. Captain Tussing didn't make any such report to you about that aircraft on the date of the accident, did he?

A. No.

Q. When you were—when you made, or the patch test which you have identified was made on the 21 of April, that was before the exercise had begun, wasn't it?

A. Right.

Q. And that was done at New River Air Station, was it not?

A. That is right.

Q. At New River Air Station what equipment did you have for charging hydraulic fluid or putting hydraulic fluid into the system?

A. The hydraulic jenney.

Q. A hydraulic jenney. What is that?

A. That is—it supplies power to the hydraulic system on the aircraft so we would be able to do our rate checks or (p. 201) other hydraulic checks, or even checking for leakage throughout the systems.

Q. And if you are low on hydraulic fluid, does that add hydraulic fluid to the system?

A. The hydraulic jenney does not add to the system.

Q. How do you add the fluid to the system, or how did you do it at New River Air Station?

A. All right. By adding and servicing up the system.

Q. Servicing it?

A. Usually dry hydraulic hand pump servicing unit, and some of them do use the hydraulic jenney to do it, but it is not called for because you can blow the systems up.

Q. And in any event, after the system was serviced on the 21 of April, then a patch test was conducted, was it not?

Or do you conduct the patch test before you service it?

A. No, the aircraft is fully serviced and they run the A. P. P. to cycle the control, the components by a good few minutes to get everything circulating and warmed up, and then they have a bleeder valve on the reservoirs, except the first stage. The first stage they use a jenney, and the third stage as far as getting everything circulated and running through there before they take the patch test.

Q. And that is what was done on the 21 of April?

A. Yes.

(p. 202) Q. Okay. But no other patch test was done between the 21 of April and the day of the accident, was it?

A. To my knowledge, no.

Q. And yet the aircraft was serviced and the hydraulic system was serviced every day, wasn't it?

A. No, I only serviced that aircraft once in that one week, and that it when utility pressure, I mean utility reservoir indicated down towards the refill line through and due to the engine wouldn't start itself, pump leaking.

Q. But you had to add some hydraulic fluid at that point, didn't you?

A. For the utility system, yes.

Q. Did you yourself add fluid to the system?

A. No. The hydraulics man did.

Q. And did that then become a part of the general hydraulic system?

A. Pardon.

Q. Did that then, that fluid flow into the general hydraulic system?

A. It flows into the utility system.

Q. Was any patch test made at that time?

A. No.

Q. Well, shouldn't a patch test have been made at that time?

A. On the aircraft itself, no.

(p. 203) On the servicing unit, yes. The servicing units the checked daily.

Q. And were in fact the servicing units being checked during this exercise?

A. I don't know. I would have to talk to the Q. A. representative which maintains logs, and they were supposed to be checked by Q. A. themselves.

Q. You don't know whether they were being checked or not?

A. Right, I do not know.

Q. Has it been brought to your attention that when the system, hydraulic system was checked on this aircraft after it was taken from the water, that it was found that there were contaminants in excess of Class 5?

A. It was brought to my attention, but, my opinion on that there is, I don't know how.

Q. But in any event some manner between 21 April, when it checked out I believe as you say pretty good, and until the 27th of April, somehow or another contaminants raising it to a Class Five and above had gotten in, had they not?

A. That is what they said, yes. On all three systems, though.

Q. And did you yourself, do you have any reason to doubt that that was what was found?

A. I don't disbelieve the investigation process. I find it very puzzling, because when we left New River, that was

my (p. 204) aircraft and when it flew or anyone would on it I was on it, and there was only one component that had a leak that required servicing and repaired that—

Q. What was that component that did require repair?

A. The winch engine start pump.

Q. And is that a part of the system, hydraulic system as the servo system?

A. One half. The utility system.

Q. What did you do to repair that?

A. The hydraulics man re-packed the fittings.

Q. Do you have to take anything lose to be able to re-pack the fitting?

A. Yes, they take the line loose.

Q. You had to take a line loose?

A. Right.

Q. Aren't you supposed to conduct a patch test every time you take a line loose?

A. Yes, I believe you are supposed to.

Q. But you didn't, did you?

A. I don't know if they did one or not.

Q. But you didn't do one?

A. I don't do the patch test.

* * *

(p. 205) Q. You don't do the patch test, do you?

A. Right.

Q. You didn't do the patch test?

A. I haven't done the patch test in all the years I have been flying, the hydraulics man does.

Q. You did take a line loose?

A. Yes, right.

A. Right.

Q. That does require a patch test?

A. Right.

Q. You don't know whether anybody else did a patch test or not?

Is that correct?

A. To my knowledge, that is correct.

Q. To your knowledge no one did?

A. I don't know if they took one or if they didn't take one. I didn't follow it up because we were in between (p. 206) flights, we had to re-launch back out.

Q. You were concerned about getting the aircraft ready to go again?

Is that right?

A. Getting it repaired, find out if we had any problems with it. We checked it all over.

Q. Did you do that between the first flight and the second flight on August or April 27?

A. As far as checking the aircraft over, yes.

Q. Replacing the seal?

A. What seal?

Q. Well, you said you had to take a line loose?

A. Fitting.

Q. Yes. When did you take the line loose, was that on the day of the accident?

A. Right.

A. I didn't take the line loose itself, I had a hydraulics man come out there. He said, we have got a problem with it leaking, said it won't take put a few minutes to re-pack. He re-packed it, serviced it back up and we re-checked it to make sure it would not leak.

Q. It was the hydraulics man not you that actually took the line loose?

A. It is a possibility I did take the line loose, I didn't mean I didn't see him take it loose. I am not sure (p. 207) how that packing goes on there.

Q. Well, I am confused. I thought you said a line was taken loose, didn't you?

A. According to the sign off they said the line was taken loose and re-packed and it checked out. And I don't know if they—I do not know for sure if they took the patch test on that specific system.

Q. But that occurred between the first flight and the second flight on April 27, is that correct?

A. Yes, it did.

Q. You didn't watch them do it?

A. No, I didn't.

Q. But you know that at the end of the first flight it was leaking and at the beginning of the second flight it wasn't leaking?

A. Right.

Q. So they apparently had done whatever you asked them to do?

A. Right.

Q. And the reason that you didn't check on the patch test was because you were in the middle of the exercise and you wanted to get the aircraft going again?

A. I had to check over the whole aircraft, that is my function, I have to make sure that—

The Court: After you find the leak, then it becomes (p. 208) the hydraulics man's responsibility to fix it?

A. Right. Then he fixes it over, all right. I go back over it check that he did his job properly, I mean as far as there is no other leaks, there is nothing changed, nothing broken, they didn't leave no tools laying up in there, and get it ready.

Q. Your job really is to check the result and not how he got the result, is that right?

A. Right. Because, you see it is his responsibility, each shop and each section has a duty inspector which comes out and re-inspects the job to make sure that the job was done properly and is in accordance with the mims, which is the shops senior maintenance man as far as making sure that all the maintenance functions were performed correctly.

Q. When you were flying right before the accident occurred, did you hear any conversation about a wave off from the carrier?

A. Yes.

Q. And what was that conversation?

A. Well, I remember we were getting the wave off but I don't remember the whole conversation. I know that we were initiating a wave off.

Q. At that time who was flying the aircraft, if you know?

A. Prior to the wave off?

Q. Yes.

(p. 209) A. It was the co-pilot.

Q. And then did you hear the pilot say that he was taking over?

I won't be that specific. Did you ever hear the pilot say on the intercom, I am going to take over the flight?

A. I don't remember him specifically saying that. I do remember him saying that I have got it, which means that he has got the controls.

Q. Did you hear any acknowledgment from Lieutenant Boyle?

A. I don't remember that if he did or not.

Q. Then what is the next thing—

A. Usually there is no acknowledgment once the pilot says that he has got it.

Q. Then what was the next thing you heard on the intercom?

A. I can remember something about not enough cyclic, or the stick is jammed, or something like that.

Q. Do you remember whose voice it was that said not enough left cyclic?

A. No, I couldn't exactly swear which one it was.

Q. But you did hear those words, or something like that?

A. Something to that effect.

Q. That was after the captain said he was taking over?

A. Right.

Q. And then were you aware of the fact that the aircraft (p. 210) was going in a rather steep bank?

A. When he initiated the wave off, which to me went smoothly, and it just kept increasing. And that time frame they said something about the stick, they couldn't get it back. And it just seems like a few seconds after that we were in the water and they were saying something about we were going to hit. I think they said on the I. C. S. something like, we are going to hit. And I definitely heard an increase in rpm just prior to impact.

Q. What did they—what do you mean by increase in the rpm? First of all, what does rpm stand for?

A. That is revolutions per minute.

Q. Is that of the rotor or of the engine?

A. The engines.

Q. And do the engines ultimately control the rotor?

Are the engines what turn the rotor?

A. They produce the power which is transmitted to the power turbine through the nose gear box up into the main gear box to turn the rotor head and the drive systems.

Q. And so what does an increase in the rpm mean in so far as engine increases in the blade rotation is concerned?

A. Would you repeat that, please?

Q. Let me put it another way. If you increase the rpm are you increasing the power available to fly the aircraft?

A. Yes.

(p. 211) Q. And when you were sensitive to this increase in the rpm did you feel any particular response of the aircraft one way or the other to it? Did it seem to come up or straighten up or go in any direction?

A. No. We were, just seemed like we were in a slight nose right real hard turn that kept increasing, and just prior to the impact the increase in rpm's, engines are usually very slight fluctuation, but when you put a very high power demand on there you can hear the increase in the engine going up quite rapidly.

Q. That is what you heard?

A. Right.

Q. And where were you physically in the aircraft? Were you on the left-hand side or right-hand side?

A. I was right-hand side standing in the crew door.

Q. When you say standing in the door, was the door open?

A. Half open, half closed.

Q. That is right on the side of the aircraft, isn't it?

A. Right.

Q. Did you have a gunner's belt on?

A. No, I did not.

Q. Did you have any kind of safety belt on?

A. No, I did not.

Q. What was keeping you from throwing out?

A. My arms.

(p. 212) Q. You were just—you were—

A. You have a rib on both sides of the door. Whenever I stand in the door, I grab both ribs.

Q. You were standing there holding it as you saw the water coming up?

A. Right.

Q. And did you—did the angle of the turn ever knock you off your feet?

A. No.

Q. You remained on your feet throughout the entire maneuver until the impact with the water?

A. Right.

Q. And then what do you remember?

A. I remember everything inside black. I remember being in a troop seat on the left side of the aircraft. And everything was dark. There was a hole that had light in it.

Q. You don't know what hole that was?

A. That was the crew door.

I remember.

Q. You went out the crew door?

A. Right.

Q. There is also on the left-hand side of the aircraft another window, isn't there?

A. Right.

Q. The escape window?

(p. 213) And is that a window that you can take out in flight to keep the cabin cool on a hot day?

A. Right. That window was out.

Q. That window was out?

A. Yes.

Q. So you had the open window on the left side and the crew door on the right side?

A. Right.

Q. And you went out the crew door?

A. Right.

Q. From the time you saw the water coming up until you were above the surface of the water, did you ever see Lieutenant Boyle?

A. No.

Q. Did you ever hear him say anything?

A. You mean just prior to the impact?

Q. Yes.

From the time you were looking down out the crew window and you could see the water coming up, did you hear Lieutenant Boyle say anything?

A. No.

Q. All right.

You never saw him again after you got out of the aircraft.

A. No, I did not.

Q. As you come out of the cockpit into the cabin, is (p. 214) there a step down?

A. Yes, there is.

Q. How much of a step is there?

A. To the crew box. I say the step down is about like that.

Q. That looks like about two feet?

A. About two, yes about two feet.

Q. What is the crew box?

A. It is a storage container that we can like keep tie down chains in or associated equipment with the aircraft and/or our flight gear in it in between flights while it is on the ground.

Q. Does the crew box rest on the deck of the aircraft?

A. It is bolted to the deck.

Q. Bolted to the deck of the aircraft?

A. Right.

Q. Is there any gap between the bulkhead for the cockpit and the crew box or does it fit up flush against the bulkhead.

A. No, there is a gap.

Q. How wide is that gap?

A. Maybe two or three inches.

Q. So if you step down out of the cockpit, is you missed the crew box your foot might get caught between the crew box and the bulkhead, is that right?

(p. 215) A. No.

Q. All right. Why would that not be? There is not that much space?

A. Well, when you are stepping out, all right, not unless you are talking about a gap about like that, I don't see how your foot can get caught in there even wearing boots.

Q. If you step out of the cockpit you would step down on the crew box?

A. Yes.

Q. How wide is that crew box? How deep is it?

From front to back, not from side to side.

A. Front to back, probably about like that right there.

Q. That looks like another two feet?

A. About a foot and a half to a foot.

Q. How high is it off the deck of the aircraft?

A. Say about two foot off the deck.

Approximately.

Q. So when the pilots get into the cockpit they come in the crew door and then they step up on the crew box, and then they step up from that into the cockpit, is that right?

Q. So to get out you would step down onto the crew box and then down onto the deck and then go to the door?

A. Right.

Q. Is that the way you would get out?

(p. 216) A. Yes.

The Court: Well, that is one of the ways of getting out. You mean normally.

Q. I mean normally. You land on the aircraft carrier, no problem, you want to get out and get a cup of coffee?

A. That is the same way to get out.

Q. That is the way you would get out?

A. Right.

Q. Did it ever—did you ever think about going through, once you saw that you were about to hit the water, going up into the cockpit and going out the emergency escape hatches in the cockpit?

A. No.

Q. Why not?

A. Just never crossed my mind.

Q. All right. Had you been trained that you were to go out the exits nearest you?

A. Yes.

Q. And was that a part of the training that the fleet gave you?

A. The training, that being NATOPS evaluator, I do train people on how to egress the aircraft is we use the cabin area. Mine is to maintain bearing and go out the nearest and easiest exit.

Q. When you say the cabin area, that refers to the cabin?

(p. 217) A. The cockpit. We do not go into the cockpit.

Q. You are not training cockpit personnel, you are training cabin personnel?

A. Crew chief's, first mates.

Q. Does the crew box have a lid on it, or how do you get into it?

A. It has a lid on it.

Q. And is that lid secured in any way?

A. The majority of them has got, let's see, wait a minute.

There is usually a double latch, and we usually put a hasp on it for securing of gear to make sure nobody gets in it.

Q. Do you know whether it was secured that day?

A. That, I don't know.

Q. Do you have any tie down ropes aboard the aircraft?

A. Yes.

Q. What is the purpose of the tie down rope?

A. The tie down ropes is for tying down the blades. They go onto the blades, and you tie them down to the four mooring points for any excessive wind to keep the blades tight.

Q. Where were the tie down ropes on the aircraft that day?

A. In the aft cabin about the ring.

Q. In a box of any kind?

(p. 218) A. No, I had them secured in the litter hooks, the last three stations on each side of the litter hooks back by the ramp is where I had them.

Q. How long are these ropes?

A. I can only guess at the length. I am not that familiar with them. Probably about 14 feet long.

Q. And did you have both ends secured, or was just one end secured?

A. What do you mean?

Q. You said that you had them secured in these hooks. I am wondering whether you had both ends hooked in or just one end.

A. The rope the way I secured the ropes, is I put the metal portion in my hand and wrap it around my arm. So I had one end here and the other end over here. Now, the

litter hooks itself has a hook and a latch on it. It comes up, pulls down and locks up.

Q. And so what you do is put it on a corner?

A. Both ends were around in and tightened down in the airplane.

Q. You made a coil like a garden hose?

A. Right.

Q. And then you put it up there and you latched it in place?

A. Right.

(p. 219) Q. And do you know whether they stayed secured throughout the entire flight?

A. Well, I know they were secured while we were flying around. They don't flop around or nothing.

Q. Do you know whether they came loose at the time of the impact?

A. I was told that they did but I did not see them come loose.

Q. Did you ever keep the ropes, the tie down ropes, in the crew box?

A. No.

Q. You mentioned that one of the gripes that you had seen was that the stick—was that the co-pilot's stick was off center, and you said something about retorquing it. What was that?

A. The cyclic stick itself, checking the alignment because there was no rigging of the cyclic stick itself. The

cyclic stick is placed into position, right, and you have got shims and washers on there, and you have got a pilot hole through the center which throws through your main housing for your flight control system. And it is a very tight fit bolt. The bolts probably are two or three inches long that goes through there and centers it all up.

Q. And had that been retorqued?

A. The main nut itself on the cyclic stick, that when the (p. 220) cyclic stick comes down and around it goes through this housing, the main nut is on the back.

Q. What did you do to correct that condition, or what did you ask anyone else to do to correct that condition? Didn't you say you had the bolt retorqued? Maybe I misunderstood you.

A. The procedure for fixing it or checking the placement of it is to break the nut loose, and retorquing it.

. . .

(p. 221) Q. And so you never, so as far as you know, it was still off center when the flight went into the air?

A. Right. Because I don't know if it was fixed or wasn't.

Q. Is that a condition that in your experience as a crew chief should have been fixed before you went into the air?

A. I don't believe that the aircraft would be held down or unsafe to fly with it like that.

Q. Did you check with anyone else in the squadron to find out whether the aircraft should have been down with the stick off center the way you had seen it?

A. I didn't, no. I believe Captain Tussing did.

Q. But you in your opinion the stick being that much off center was not reason to keep the craft from flying?

A. True.

Correct.

Q. And did you have a problem with the blinking ready light on the aircraft?

(p. 222) A. Flight ready light, yes, we did.

Q. What was the problem?

A. It was proximity to my sensors in the rotor head. One we knew was defective, and we had had avionics check that out several times. And I can't remember exactly which one it was.

But, we were going to order, or had ordered a harness for the one that was needed.

Q. But the harness had not been put on, had it?

A. Right. We did not get one in.

Q. So you were flying with that condition uncorrected, were you not?

A. Correct.

Q. And you were aware of the fact one of the fueling gauges did not work, is that correct?

A. That is correct.

Q. Was that a matter of concern to you?

A. No.

. . .

(p. 224) Q. Had you had some problems with the the whitaker valve on the aircraft?

A. Yes, on the cycle we did.

Q. What is the whitaker?

A. The whitaker valve is routed through the blade fold system. It is hydraulic and electrical.

Q. Without explaining technically what it does, what part of the aircraft or what part of the flight does the whitaker valve help control?

A. Of the flight?

Q. Yes. What does it do?

A. Well, it assists through your blade fold. It drops second stage from 3,000 to a thousand P. S. I. and once that is complete it sends signals through for your pitch locks to lock the primary servos for position. And then once you pitch locks are set, the blades are folded.

Q. Does it do anything but relate to the folding and (p. 225) unfolding of the blade?

A. The whitaker, yes, it does.

Q. What else does it do?

A. It gives you your flight ready light. They are associated with—I mean, it has to when you get done spreading, the blades are spread and locked and the primary servos, the pitch lock is retracted, it reduces or increases pressure if you have a whitaker valve on top, with a lever, which is done hydraulically and electrically, will go back into the flight position and your second stage system will go back to 3,000 P. S. I.

* * *

(p. 226) Q. How long have you been assigned to the CH-53 series aircraft?

A. I started crewing or working on the CH-53 aircraft in June of 1975.

Q. At that time was there any Navy standard about how long you could use a servo before it had to be removed?

A. There is a time cycle. Right, to my knowledge. But there is a manual that will tell you how many hours the main gear box has to have on it, how the primary servos or all the components, you usually have a time frame.

Q. What is the time for an AFCS servo?

A. That I don't know, sir. I don't have the manual here to check it.

(p. 227) Q. Do you know whether in fact it is on condition and that it, stays on the aircraft until it needs to be replaced in the view of the crew chief?

A. That I don't know, sir.

Q. Have you ever removed or asked the hydraulics people to remove a servo from an aircraft because it had exceeded its maximum hours?

A. Not to my knowledge.

Q. Is it the crew chief's responsibility where a part is only supposed to go a certain number of hours to keep up with that, or is that the responsibility of somebody else?

A. That is the responsibility of the maintenance admin department.

Q. That is your not your responsibility?

A. Right.

Q. No further questions.

* * *

(p. 229) Q. I thought I was following the cross. Do you know what ocean water would do to a hydraulic system open to it?

A. I know what it would mean to lines. It would contaminate. I know salt water is highly corrosive.

Q. What if the aircraft were inverted or on its, over on its back down in the mud 35 feet of ocean water off of Virginia Beach with hydraulic lines open, do you know what would happen to the hydraulic?

A. Water gets into the systems.

Q. Would mud also get into the system?

A. Yes, it would.

Q. And sand?

A. Yes.

Q. Are there other things down at the bottom of the ocean?

Okay.

Q. Now, similiarly, Sargeant Tubbs, you were asked—sorry.

(p. 230) Sargeant Tubbs, the utility system you testified only runs one half of the roll servo, is that correct?

A. Correct.

Q. What system runs the other half of the roll servo?

A. Second stage.

Q. Second stage?

A. Second stage system.

Q. Now, can you point—not point. I should say, what is the first system that is used for the roll servo, the one the pilot is normally on when he is flying the aircraft?

Utility or the second stage?

A. That I am not sure of.

Q. All right. To your knowledge—correction.

The Court: Counsel, you know that redirect is basically just ping-ponging a witness back and forth. If you have any other questions, ask them. Otherwise I will dismiss the witness.

Q. Your Honor, I will ask him.

The Court: All right.

Q. Sargeant Tubbs, if the moog valve on top of that servo is jammed in an open position, what happens to the pilot's cyclic stick?

The Court: There is nothing—that is improper redirect. Your objection is sustained.

Q. Your Honor,—

(p. 231) The Court: Counsel, I have ruled on it. Your displeasure of my ruling is in the record. Move along. I don't debate things after I rule on them.

Q. What would happen, Sargeant Tubbs, if there is a mechanical jam of the moog valve on the roll servo? What happens?

Mr. Booker: Same Objection.

The Court: The objection is sustained.

Q. Your Honor, Mr. Booker asked these various questions I was asking.

The Court: The objection is sustained, counsel. Move along.

By Mr. Franecke:

Q. Sargeant Tubbs, if there is a mechanical jam of the moog valve, are you able to switch off of that moog valve?

Mr. Booker: Again, Your Honor, I never mentioned moog valve in my questions.

The Court: Objection is sustained.

Q. If there is a mechanical jam of the servo, is it possible to switch off of the servo?

A. I believe there is, yes.

Q. Does that mean there is still power going to the servo mechanism being accentuated by the pilot?

A. Yes, there is.

Q. If there is—do you know what the function of the (p. 232) moog valve is in relationship to the rest of the body of the servo?

Mr. Booker: Objection.

The Court: The objection is sustained.

Q. When you were asked by Mr. Booker if you could unswitch a mechanical jam of the servo, were you considering the moog valve in your answer?

Mr. Booker: If Your Honor please, I object.

The Court: The objection is sustained.

Counsel, it is very seldom that I warn anybody more than three times. Disobeying one of my orders I have sustained consistently as to the moog valve, because he did not go into that. I would suggest that you abide by the court's rulings and move on to something else. Your objection to my ruling is in the record, and that is all you are entitled to. Ask the next question so I can rule on that.

* * *

(p. 233) Would you state your name, please.

A. James David Koewn.

(p. 234) Q. By whom are you presently employed?

A. I am presently employed as a school teacher in Uphams County, Kentucky.

Q. In April and May of 1983 by whom were you employed?

A. United States Marine Corps.

Q. And what rank did you hold in May and April of 1983 in the United States Marine Corps?

A. I was a major at the time.

Q. Have you had flight training?

A. Yes.

Q. Can you briefly describe your flight training?

A. Well, I went through standard naval flight training in Pensacola in '65 and '66 which is the preliminary pre-flight, then some small fixed wing flights, and then I ended up getting my wings as a helicopter pilot.

Q. What types of helicopters have you been qualified in to fly?

A. CH-34 and CH-46.

Q. Are you or were you at the time, or were you a helicopter command pilot?

A. Yes.

Q. How long were you a helicopter command pilot?

A. Oh a rough guess, eight to ten years, I don't know exactly.

Q. Did you hold also various duties and posts during, (p. 235) what was it, 20 years in the Marine Corps?

A. Yes.

Q. Did you then retire?

A. That is right.

Q. During your tour of duty of twenty years in the Marine Corps did you hold various maintenance or flight safety posts at your various locations?

A. I have had a couple flight safety posts. Only some maintenance posts way back early as a young lieutenant and not any recently.

Q. I see.

In May and April of 1983 where were you stationed?

A. At New River, North Carolina.

Q. What capacity were you stationed there?

A. In '83 I was group logistics officer.

Q. Were you in a flying capacity at that time?

A. Well, I was not with a flying squadron, but as such all aviators assigned to Marine Air Wings and Groups are flying status to a squadron and I was flying at the time, yes.

Q. Did you have occasion to be ordered by your commanding officers to conduct what is commonly known as a JAG and accident investigation?

A. That is correct.

Q. When were you so ordered?

(p. 236) A. Specifically it is in the book here.

Q. You may refer to Exhibit One if you like.

A. In April of '83.

The Court: Give us the precise date if you will so the jury can get the chronology straight.

And counsel, if you know it lead him through these things that are a matter of documentation.

Q. Certainly.

A. Appointment letter dated 28 April of '83.

Q. Are there any sets of regulations that you are to follow while you conduct this JAG investigation of an accident?

A. Yes. It is almost like following a recipe. There is (p. 237) a JAG manual which is a legal document which discusses formal and informal JAG investigations, and we just follow the document.

Q. By the way, I am using the word "JAG." What does "JAG" mean? What does it stand for?

A. Judge Advocate General.

Q. That is the legal side of —

A. The legal side of the military house, which is separate from military command.

Q. All right. What did you do with regard to beginning your investigation of the accident?

A. Well, as in almost any type accident, the first thing I did, of course, was to get the JAG manual and get myself familiar with what I needed to do. As I say, the manual lays out the procedures almost like a recipe, steps to follow, really. The basic procedure is collect all the facts you can on the case, and I proceeded to start collecting facts.

Q. How did you go about doing that?

A. Well, of course, I was investigating this accident. There were some, by the time I received the appointing letter I was familiar—I did know that an accident had occurred, and there was a little material on it. In other words, the accident messages which came out indicating that an accident had occurred, the location, the time and date, everything that was involved. I collected items like that. And then I (p. 238) proceeded to get witness statements from those that saw the accident.

Q. I see.

Who did you interview with regard to getting witness statements?

A. Well, there were several individuals I interviewed.

First individuals I interviewed were some individuals who were flying the day the accident occurred in the aircraft with another squadron with an H. 46. 261 as I recall.

Q. Yes.— And I interviewed several of these individuals who saw the accident.

A. Or I interviewed the crew members that were involved in the accident. I interviewed some—a person, a couple of people at Norfolk, Virginia who I drove up and interviewed a boat captain who rescued one of the individuals. I interviewed a Navy diver who was involved in securing the wreckage. And also in recovering the body.

I involved—I interviewed some maintenance personnel at New River. And let's see, the flight surgeon, of course, who was involved in the accident.

Q. Did you take statements from these individuals?

A. Yes, I took statements from—I interviewed a lot of people. But I took statements from those who I considered most pertinent. A lot of people I interviewed saw the accident and they could really shed no specific light on (p. 239) anything other than seeing the aircraft hit the water.

Q. Were other witnesses you interviewed have more significance?

A. Well, those who had significant testimony—

The Court: Counsel, this isn't a discovery trial. Get right to the point of something. While it is interesting to

the jury, it isn't probative of any issue that they have to resolve.

Q. Yes, Your Honor.

Major, could you look at Exhibit One and tell us whether or not that is your accident investigative report pertaining to this particular accident?

A. Certainly is. It has my signature.

Q. Does that contain the witness' statements that you obtained from the various witnesses?

A. Yes, it does.

Q. And this was prepared as a result of your orders as a United States Marine to obtain these various witness statements, is that correct?

A. That is correct.

Q. Now, in addition did you also seek various information pertaining to the maintenance regarding the helicopter that crashed?

A. Yes, I did.

Q. What did you do to go about obtaining information (p. 240) pertaining to the maintenance?

A. Well, every aircraft has a maintenance record in the Marine Corps from the time it is accepted by the U.S. Navy, Marine Corps, which has all the maintenance action performed on the aircraft, it is a list of that maintenance which I secured the books on that aircraft, we call them maintenance log books, and had some personnel go through those with me.

Q. You did in fact review these various maintenance log books?

A. Yes, I did.

Q. Did you find anything of significance with regard to these maintenance log books with regard to the work that had been done on the aircraft?

A. Well, there were some items which appeared, none which I considered to be of major significance, really. In fact, I had a quality control officer of the air group to go through the books, and he has a statement in here which he considered—

Mr. Booker: I object to that as hearsay.

The Court: The objection is sustained.

Q. Is there a statement in the investigative report from the maintenance officer from the quality control officer?

A. At New River, yes.

Q. What is the name of that quality control officer?

A. Lieutenant Jim Griffin.

(p. 241) Quality assurance data I think is the more correct terminology.

Q. Quality assurance.

Did he indicate to you anything that would be of significance for further investigation on your part?

Mr. Booker: Objection.

The Court: The objection is sustained.

Counsel, I said one time this is not a discovery deposition. I assume that you have taken this individual's dis-

covery deposition, and I expect if you did to follow up and put on probative evidence to this jury.

Q. Yes, Your Honor.

Did you go down to visit or to view the actual wreckage of the helicopter?

A. Yes, I drove up to Norfolk probably a week or so after the accident.

Q. All right. The picture that is on your left, does that appear to be the accident helicopter?

A. It is apparently, yes.

Q. At the time that you were there at Norfolk, had there been various items of the helicopter removed?

A. Yes. As I say, I got there probably at least a week after the accident, five to seven days.

Q. Do you know where those other pieces of the helicopter have been removed to?

(p. 242) A. I was told they were sent to Pensacola.

Q. Did you go to Pensacola to look at any of the other wreckage?

A. No, I didn't.

Q. Did not go to Pensacola?

Did you have contact with anybody at Pensacola with regard to the further investigation taking place down there on the items of wreckage?

A. Pensacola was running engineering investigation on the parts of the aircraft. I had a point of contact down there, Mr. Fox from Pensacola who was then the engineer

in charge of the investigation. I tried calling him several times, I think I made a couple of contacts with him just to determine the progress of the investigation, but I really didn't have a lot of detailed conversation with him.

Q. Okay.

Did you ever receive a report from Mr. Fox?

A. Well, there was engineering investigation which was tendered by Pensacola at the end of the—well, at the completion of their investigation, which wasn't sent directly to me, it was sent to all interested parties. I did get a copy of that, yes.

Q. Is that included within your accident investigative report, exhibit one?

A. Yes.

(p. 243) Yes, it is.

Q. As a result of your investigation did you have occasion then to look into the cockpit of a CH-53 helicopter?

A. Well, yes, I looked in the aircraft we had there as well as I looked at other aircraft.

Q. Was there anything of significance that you found as a Marine aviator in your examination of the cockpit of the CH-53 helicopter that may have related to your investigation?

A. Well, the most noticeable thing I assume was the escape hatch on the co-pilot's side was not jettisoned as a result of his attempting to get out of the aircraft.

Q. All right.

Was there anything with the collective that was of significance to you?

A. Well, we had conversations about the collective, the specific aircraft.

Mr. Booker: If Your Honor please, I object to conversation. The question was what he saw.

The Court: Right.

His question, major, was what did you see that was significant, not what was told to you.

A. The question, on that aircraft as I saw, I saw the crash aircraft as well as I looked at the cockpits of others.

The Court: Focus on the crash aircraft. Did you see anything about the collective in that aircraft—

(p. 244) A. I don't specifically recall, frankly.

Q. What about the other aircraft that were similar that you looked at?

A. Well, similar—

Mr. Booker: If Your Honor please, I object to that as irrelevant. If he doesn't recall anything about the crash aircraft, that is what we are involved with, not some other aircraft under other conditions.

Q. Your Honor, he is doing a JAG investigation and certainly it was incumbent upon him to gather information both on the aircraft and—

The Court: He can tell what he saw in them, and hopefully you will tie it in in some relevant form, because I hate for this jury's time to be wasted on a lot of miscellaneous type information that basically has been bled from this witness so far. Can you answer it, major?

A. Yes, sir.

What we are talking about here is a point which I brought out in my report, that in the H. 53 the collective when it is in a certain position makes it difficult to get to the jettison handle on the escape hatch.

The Court: For the pilot or co-pilot?

A. For the co-pilot.

The Court: All right.

Q. Why is that?

(p. 245) A. Well, when it is raised in the upper third or two thirds or so of travel, you pull it up over the escape jettison lever which makes it a little difficult to reach.

Q. I would like to show you a picture of—

It has already been marked.

The Court: Major, do you know what position it was in at the time of the crash in this case?

A. No, sir, I certainly don't because the aircraft I looked at, the crash aircraft at Norfolk had been there, other people had moved it around, and frankly I moved it around myself. I can't say what position it was in at the time of the crash.

Mr. Booker: If Your Honor please, I object to any testimony as irrelevant.

The Court: No, the objection is sustained at this point, because until there is evidence that pinpoints the location of the collective at the time of the crash, the fact that you could position one to make it difficult has no relevancy.

Q. Major, in your taking of the statement of the pilot of the aircraft, Captain Tussing, did he indicate to

you in what position the collective was at the moment of impact?

Mr. Booker: I object. The captain has testified for five hours here today.

The Court: The objection is sustained.

(p. 246) Q. Were you informed from any source whether or not the collective was in fact in the up position?

Mr. Booker: Hearsay, Your Honor. I object.

The Court: Objection is sustained.

Q. As a part of your JAG investigative duties and for preparation of your report which I believe is enclosure 18 to the exhibit 1, did you have any information which indicated to you that the collective was in the up position at the moment of impact.

Mr. Booker: Same objection, Your Honor.

The Court: Objection is sustained.

Q. On what basis did you in your report, jag investigative report on enclosure 18—

Mr. Booker: If Your Honor please, I object to his reading what he concluded. That is what he is about to do.

Q. No.

Mr. Booker: We objected to that exhibit for just the reasons that the court sustained us.

The Court: The objection is sustained.

Q. Your Honor, I actually was not about to read it, I was going to ask why major—

The Court: But if it was a hearsay statement that someone else said, I assume you found out all this out at the time of his discovery deposition was taken, and he identified the people that he talked to. The objection is sustained. I (p. 247) don't want to rule on this same point again.

Q. I understand.

The Court: Ask the next question.

Q. I am sorry, I don't understand the basis of the ruling so I can formulate the other question.

The Court: I ruled it was hearsay on the questions that you have asked for the last five minutes that have been objected to. So let's have another question.

Q. Did you personally move the collective of a CH-53 type helicopter to see how its positioning is with relationship to the co-pilot's escape handle?

A. Yes.

Q. All right. What did you do?

Moving the collective?

Mr. Booker: If Your Honor please, I can only object again that there is no testimony where the collective was. Whatever Major Koewn may have been able to simulate is irrelevant.

The Court: The objection is sustained on the grounds of relevancy at this point. But here again for the record, major, I would assume if you manipulate the collective you can probably get it in front of the emergency release handle on the co-pilot's side in a way where it would block it to an extent, is that correct?

A. Yes, sir.

(p. 248) The Court: All right. Fine. That is in the record. Move along. He has no direct evidence of its position at the time of the crash, and I won't let you abuse this jury by going into it any further on a witness who has no first hand knowledge.

Q. Major, did you also attempt to determine whether or not Lieutenant Boyle, the decedent in this crash, had received appropriate egress training in the United States Marine Corps?

A. Yes, I did.

Q. Did you—did you make such a determination?

A. Yes. He had received egress training, as all of us in Pensacola during initial training, and also egress training within the prescribed year prior to the accident.

Q. Was he then within the Marine Corps' regulation for egress training as far as you understood it?

A. Yes.

Q. Did you at any time have any conversations with any Sikorsky representatives with regard to the AFCS servo?

Mr. Booker: If Your Honor please, I object without some foundation.

The Court: All right. That is easily supplied. Ask whatever foundation questions are necessary.

Q. As a part of your investigation did you have occasion to contact or talk to any Sikorsky representatives regarding (p. 249) your investigation?

A. Yes, I did.

Q. And do you recall where you had this conversation?

A. At the air station at New River.

Q. And do you recall who?

A. No, I don't recall names.

Q. Do you know what the position or job title of this particular Sikorsky representative was?

A. Not particularly. They were technical representatives attached to the air group who provide assistance to the H. 73 squadrons.

Q. Had you talked with this individual on other occasions just about other matters?

A. Not really. Since I am not a 53 pilot, I never talked to him on other occasions.

Q. What was it that you asked this Sikorsky representative?

Mr. Booker: If Your Honor please, I am going to object to that. I think foundation has not been shown.

The Court: The objection is sustained.

Q. How did you know that this Sikorsky individual was in fact from Sikorsky Aircraft?

A. Well, they have their own area they work in. In fact, they have a trailer in which they work out of which is identified as a Sikorsky tech rep area.

(p. 250) Q. This was a trailer that you recognize as being Sikorsky's?

A. Yes.

Q. And do they wear any kind of badge or something that indicated they were from Sikorsky?

A. They have name tags, yes.

Q. Does that indicate they are from Sikorsky?

A. Yes.

Q. Do you know what—did they—did this individual tell you he was a technical representative from Sikorsky?

A. Not as such. It was just I basically was pointed him out to by a maintenance officer in the 53 squadron, here is a man who can help you learn something about the system on the C. H. 54.

Q. Did he imply to you that he was from Sikorsky Aircraft?

Mr. Booker: If Your Honor please, I object to what a maintenance officer in the squadron implied.

The Court: The objection is sustained.

I assume, major, you assumed he was a Sikorsky person and made no further inquiry, is that correct?

A. That is correct. He had a name tag on with Sikorsky.

The Court: Your objection to this line of questioning is sustained, the 30 B. 6 deposition would have developed it and smoked it out. I am not going to allow this kind of (p. 251) looseness during a jury trial. Proceed.

Q. Did he have any other, did he have any other identification that you saw on this individual that indicated that he was from Sikorsky Aircraft?

Mr. Booker: If Your Honor please, I think the court has already ruled. I object.

The Court: Counsel I have ruled on that. Ask the next question.

Q. What were you—what information were you seeking when, pardon me—what information were you seeking when you were trying to find somebody to answer your questions?

A. Well—

Mr. Booker: If Your Honor please, I object to that as too vague if it relates to what—

The Court: The objection is sustained. The question is so general in nature that any answer given would not be helpful to the jury.

Q. Certainly.

Major Koewn, were you seeking to find an answer pertaining to a possibility of a jammed servo at the time?

Mr. Booker: If Your Honor please, object for the same ground.

The Court: Well, that is doubly tainted. It is leading, plus it is still too general. The objection is sustained.

(p. 252) Q. What line of inquiry were you following when you were seeing a technical representative from Sikorsky with regard to a jag investigation?

Mr. Booker: If Your Honor please, it is the same leopard, same spots. I object.

The Court: The objection is sustained.

By Mr. Franecke:

Q. When you were seeking a technical representative from Sikorsky were you interested in the—

Mr. Booker: Object to this as leading.

The Court: The objection is sustained.

By Mr. Franecke:

Q. Major Koewn, did you prepare a document entitled enclosure 18 to exhibit one?

A. Yes, I did.

Q. On what basis, what information did you base the information that you have contained in exhibit or enclosure 18?

A. Enclosure 18 was an enclosure I did which the jag manual states that an investigating officer can do to try to tie together loose facts. I tried to tie together loose facts which came from witness statements, which I didn't include, and other things of that sort.

Q. Did you conclude as a part of your statement here that it was—

(p. 253) Mr. Booker: If Your Honor please, I object to that as leading, and I am put in a terrible position where I—

The Court: But I am going to take you off that position counsel, you defy my order one more time and I will deal with you in a way that I deal with counsel when they defy direct court orders. Now proceed.

Q. Major Koewn, did you draw any conclusions from your investigation that was prepared as part of your jag investigative report?

A. Well, yes, that is one of the outlines of the jag is to find facts, come up with opinions, recommendations and conclusion. Yes, I did come up with conclusions.

Q. What were those conclusions?

Mr. Booker: Object, Your Honor.

The Court: The objection is sustained.

* * *

(p. 255) Q. Did you at any time other than the time you mentioned perhaps talking to a Sikorsky representative, did you try talking to a Sikorsky representative any other time regarding your investigation of this case?

A. Well, I went to them asking for interpretation of the engineering investigation report the, E. E. I.

Q. Let's lay the foundation on that. You how do you know you were talking with a Sikorsky representative on this other occasion?

The Court: This was Fox's report to you, major?

A. Yes.

The Court: Fox's.

You so you had nothing do with that engineering report?

A. Nothing to do with that at all, sir. That report was to me just an autopsy of the aircraft, it was telling the (p. 256) what had happened to the aircraft.

* * *

Q. How did you go about seeking out a Sikorsky representative on this other occasion?

A. It was not only Sikorsky reps. I talked to other pilots and maintenance officers in the three different 53 squadrons [ROPBS] we had there. A. 3 Delta squadrons as well as talking to these folks. They led me to Sikorsky to get more detail information from the tech reps.

Q. All right. What is it that identified to you that you were in fact talking to a Sikorsky representative on this other occasion, what about them?

A. Well, they were the same individuals, they were just introduced to me as Sikorsky representatives.

Q. When they were introduced to you, did they deny their (p. 257) being a Sikorsky representative?

A. No.

Q. Did they say that they were Sikorsky representatives?

A. No, they just accepted the acknowledgment.

Q. Accepted the acknowledgment. Did they also wear some kind of a badge or something else that would identify them as being a Sikorsky employee or representative?

A. Yes.

Q. What was that?

A. A name tag.

Q. The same individuals?

A. There were two individuals primarily I talked to, yes.

Q. And it was specifically said in front of them these are Sikorsky representatives and were introduced to you, is that correct?

A. Yes.

Q. And they did not deny that?

A. No.

Q. All right.

Your Honor, I will inquire rather than incurring the displeasure of the court whether a sufficient foundation has been laid.

The Court: Counsel, you never incur my displeasure.

You are doing things in a proper legal way or you aren't, and my rulings are always premised on that. Bear that in mind, (p. 258) will you?

Q. Of course.

The Court: All right.

Mr. Booker: If Your Honor please, I am going to object again for the same reasons as before.

The Court: I am sustaining your objection because this is a loose, sloppy way of doing business, and there is a precise way. I am not going to ever condone sloppiness in my court, since you that is how you run trials. I suggest that you go out and get Mr. Box or you find out by stipulation with the Marine Corps who it was, that would have been a simple matter to do it right. So that we would know the individuals that we are talking about. If you didn't go to the trouble to do it that way, then you don't get it in through this major. I have ruled on it, move on to something else.

Q. Your Honor, as I said, it was offered also as an admission of a party.

The Court: I understand that, except that you have to show that the party is capable of making an admission against the corporation that you propose to have the admission made against. It is a simple routine day-to-day bread and butter event for a lawyer to be right, and you haven't done it right, and until you do, you don't get it in in my court. Now, move on.

* * *

(p. 259) Q. Major Koewn, you are not qualified and never have been qualified as a CH-53 pilot, have you?

A. No, sir.

Q. Never really flown one, have you?

A. I have flown a couple of times as a co-pilot, just for a ride more or less.

Q. But not as a qualified pilot?

A. No.

Q. And you had never conducted an investigation of an aircraft accident before this one, had you?

A. Oh, yes.

Q. Of an aircraft accident?

A. Yes.

I was a safety officer in a squadron in Vietnam.

Q. Let me be more specific. Never conducted a JAG manual investigation of an aircraft accident before, had you?

A. Not aircraft accident, no.

(p. 260) Q. You have done some automobile accidents?

A. Yes.

* * *

Q. All right. Could I have that photograph, please?

Major, I represent to you that is a photograph of the accident aircraft itself.

Now, in this case do you see the escape hatch?

A. The handle, yes.

Q. Do you see the collective?

A. Yes.

Q. And in this case in this picture of this aircraft the collective is not blocking the escape hatch lever, is it?

(p. 261) A. Not significantly, no.

A. And indeed when you ran the test which the judge summarized, even though the collective was in a different position you could still reach over it and reach the escape knob, couldn't you?

A. You could always reach over. It is just more difficult.

Q. But you could reach over it and grab it?

A. (The witnesses nodded).

Q. Indeed. And you determined in your determination of the type of egress training which Lieutenant Boyle had determined that would have been clearly his—nothing precluded his going out the cockpit door, would it, on dry land?

A. Yes.

Q. And did you also determine that he had had egress training in the water?

A. Yes, he had under-water egress training.

Q. Did that egress training involve an emergency door, or was that simply an open cylinder?

A. Just an open hatchway.

Q. So he didn't have to open any escape hatch to get out under water?

A. No.

Q. And that was the only under water training that your (p. 262) review of the record showed that he had received?

A. Yes.

* * *

Q. All right. Did you find any difficulty when you moved it up in getting to the escape handle?

A. Well, there is a certain degree of difficult, yes. When it is moved—the further up you move it, the harder it is to get to the handle.

* * *

(p. 271) The Clerk: Civil Action 84-0486-R. Delbert Boyle, et cetera v. United Technologies Corporation.

Continued from yesterday.

Are counsel ready to proceed?

Mr. Franecke: Yes, Your Honor on behalf of the plaintiffs. And, Your Honor, I would like to also intro-

duce Mr. and Mrs. Delbert Boyle who are present in the courtroom.

* * *

(p. 282) Mr. Franecke: At this time I call to the stand Dr. James Hayes.

(Witness sworn.)

James Hayes testified as follows:

DIRECT EXAMINATION

Mr. Franecke: In accordance to Your Honor's procedure, Dr. Hayes is a—has his doctorate degree in—I have to read it—perhaps if I read it a little more, directly.

Dr. Hayes has his doctorate degree in engineering from the University of Oklahoma with associate masters and bachelor's degrees. That he has been senior structures—

The Court: What discipline of engineering, mechanical?

A. I can answer a lot easier than he.

Q. Perhaps you better.

A. Forgive me for my voice, it is a little hoarse. I will do the best I can. I have a bachelor's degree in aeronautical engineering from the University of Oklahoma in 1952. I received a masters degree in aeronautical (p. 283) engineering from Perdue in 1956. I returned to Oklahoma and received a PHD in engineering. They do not differentiate and my major was aeronautical engineering. And I got that in '65.

The Court: And you are offering him as an expert in what?

Q. In the area having to do with the co-pilots escape system, Your Honor.

* * *

(p. 286) I would like to ask you to turn, Dr. Hayes, to Exhibit 12, please.

Is Exhibit 12 one of the documents which you have had (p. 287) an opportunity to review?

A. Yes, it is.

Q. What is this?

A. This is a part of the detailed specification for the CH-53 D. helicopter.

Q. Doctor, after reviewing this particular document was there anything in it that you found of significance with regard to your investigative processes?

A. Yes, there was.

Q. What was that?

A. I found that there are a couple of things in here, let's see if I can find it.

* * *

(p. 290) Q. All right. It is your understanding that by the specifications that it would be at 5.5 G's?

Now, was there anything in your further review of the documents with regard to the interior of the cockpit and the specification that was of significance to you?

A. Yes.

On page 40 it talks about the emergency escape. The emergency escape shall be provided for the pilot and the co-pilot through both cockpit side windows which shall be readily jettisonable.

Q. Why was that of significance to you?

A. Because I didn't find that the side windows are readily jettisonable if they are under water. They open to the outside, if they have a water pressure on them you must wait until the water pressure stabilizes, and therefore they are not readily jettisonable.

* * *

(p. 291) Q. Would you explain what it was about the CH-53 helicopter that did not make the side window readily jettisonable?

A. Okay. That window opens out—

The Court: That is repetitive. He said because it opened out and water pressure had to equalize, which means you had the same outside as you have inside so it is a neutral force. Isn't that what you said?

A. That's correct.

The Court: All right.

Q. Anything about the escape handle that was of significance with regard to the specification that you have reviewed?

A. Yes; it is not spelled out in the specification, but it is obvious from the photographs and all that the collective when it is in the full up position interferes with your

grasping and actuating the escape handle on the co-pilot's side.

* * *

(p. 296) Let me ask you.

Doctor, was this helicopter negligently designed, in your opinion?

(p. 297) Mr. Booker: If Your Honor please, that is an ultimate question for the jury.

The Court: That is what an expert is permitted to answer under the federal rules. Your objection is overruled.

A. Yes, it was.

Q. And with regard to the co-pilot escape system?

A. Yes, with regard to the co-pilot escape system, with regard to the windows, the chin bubbles, we are talking about.

Q. Would you explain to us on what basis that you—

The Court: He already has. That is repetitive. He gave us exactly his reasons before.

* * *

(p. 300) Would you turn to the first page of it now, please. And do you recognize this as the entire specification, or I represent to you that it is the entire specification.

A. It sure looks like it could be.

Q. Well, how is that headed at the top?

A. You are on page U. 85?

Q. Yes.

A. Okay. This is headed at the top S. D. 552-1-3.

Q. What is the letterhead?

A. It says, Department of the Navy, Naval Air Systems Command Washington, D. C.

Q. And is there a proprietary label which indicates that the document is the property of United States?

A. Yes, there is.

Q. And does it show an approval on there?

A. Yes, it does.

Q. By whom was this approved?

A. Captain J. B. Shaftner, United States Navy.

Q. From your experience with these contracts, what does approval by the Department of the Navy indicate?

A. That they have reviewed it and they are in basic agreement with it.

Q. And this then becomes a Navy Spec 1 which Sikorsky must follow, is that correct?

(p. 301) A. Yes.

* * *

Q. And now, as long as you have that specification before you, let's look further into it. And I ask you to look at page 40. That page contains the provision about the emergency escape to which you have already testified, does it not?

(p. 302) A. It does.

Q. And it provides the emergency escape shall be provided for pilot and co-pilot through both cockpit side windows which shall be readily jettisonable. What does jettisonable mean?

A. You get rid of it.

Q. And does that mean to throw it out?

A. That is right.

Q. And so that means the window is supposed to exit the aircraft, does it not?

A. I believe that would be one interpretation, yes.

Q. Isn't that the standard interpretation?

A. I suppose you could jettison it to the inside, just get it out of the way.

Q. You would regard it as jettisonable if it came inside?

A. I am not sure.

Q. Let me read you a standard dictionary definition. This is from Webster's International, of jettison.

"Jettison: Verb, transitive. One, to make jettison of. Two, to cast off as superfluous or encumbering: Discard. Three, to drop from an airplane or spacecraft in flight." Would you agree with that definition?

A. Yes, I don't have any problem with that definition.

Q. How much of your work, if any, has been involved in (p. 303) crashworthiness of aircraft?

A. The crashworthiness work I did was with the Army in St. Louis is when we evaluated the U.T.A.S. pro-

posals back oh, gee, I have forgotten. I would have to look. Ten or 12 years ago.

Q. Ten or 12 years ago.

Are you familiar with a document entitled aircraft crash survival design guide?

A. Published by the Army?

Q. Yes.

A. Fort Eustis, yes, I am.

Q. You are familiar with that?

A. Yes.

Q. Then may I show you a copy of that?

A. Sure.

Q. Your Honor, this was not designated as an exhibit because it is being used for rebuttal purposes.

The Court: All right.

Q. Do you know the background of this study?

A. This is not the one I am familiar with.

Q. Is this a more recent one than the one you are familiar with?

A. Yes, it is. The one I am familiar with has a date on it of 1972 which would see more applicable to the S. L.—this is dated January of '80, which came along long after the (p. 304) CH-53.

Q. Are you familiar with this company, Simular, Inc., which did it?

A. No, I am not.

Q. But is this, does this appear to be a later version of the same document with which you are familiar?

A. I can't really say.

Q. I observe up in the corner this is 22 E. Do you remember whether the one you saw might have been an earlier series?

A. I would suppose that it was.

This is the first time I have seen this document.

Q. Would you take then a second to look at it?

A. All right.

The Court: What specific area do you want him to look at?

Q. The only part I want you to look at is the part beginning on page 165 relating to exit locations from aircraft.

Mr. Franecke: It is my understanding that if the witness is not familiar with the document, that he shouldn't actually be cross-examined on it. He has already indicated—

The Court: Unless Mr. Booker vouches the record that he will put on evidence that it a standard work in the field.

(p. 305) Mr. Booker: I definitely will, Your Honor.

The Court: All right. Fine. Then the objection is overruled.

Mr. Franecke: Yes, sir.

By Mr. Booker:

Q. Take a moment to look at that and tell me when you have finished reviewing it, please.

A. Talking about page 165?

Q. Yes, starting exit location and so forth. I am going to ask you specifically about a paragraph in the middle of the page 166, but you may want to read all of the background.

A. All right.

Q. Now, the paragraph in the middle of page 166 to which I have reference says, and I am quoting, "only the single operation of pulling or pushing the exit closure into the clear should be necessary. Once the release handle has been actuated, unless the aircraft is pressurized, all emergency exit closures should be arranged to fall free or to be pushed easily outward for side exits, to be pushed upward for overhead exits, to be pushed downward, for bottom exits when the emergency release mechanism is actuated." Was this helicopter a pressurized helicopter?

A. I don't know.

Q. Do you know of any helicopter that are a pressurized?

A. I don't know one way or the other.

(p. 306) Q. Well, assume for the moment that there will be evidence that this was not a pressurized helicopter, if such an animal exists.

Under those circumstances this provides, does it not, that the window should be pushed outward for side and easily pushed out for side exits, that's correct?

A. That's correct.

Q. And these windows were side exit windows, were they not?

A. They were.

Q. And you were aware of the fact from the question that was put to you that Lieutenant Boyle had received under-water evacuation training?

A. He had.

Q. And so did the design of the aircraft here comply with this aircraft crash survival design guide put out by the Army?

A. I don't think that it did.

Q. Why is that?

A. The paragraph right above says, the emergency exit shall be capable of being completely opened in five seconds. I don't even think the pilot got his out in five seconds.

Q. What is the basis for your thinking that?

A. Because he had to struggle to get out.

Q. It is your testimony that the pilot had to struggle to (p. 307) get his window out?

A. Yes, he had water on it.

Q. Did you hear the pilot testify yesterday?

A. No, I did not.

Q. But it is your understanding that he said he had to struggle to get his window out and therefore you concluded it took more than five seconds?

A. Right.

Q. But you did not hear him give testimony to that effect?

A. No.

Q. And if no one else heard him testify to that effect, then there is no evidence to that effect?

A. That is correct.

* * *

(p. 341) The Court: The punitive damages aspects of the case are dismissed under Virginia law. It takes a very substantial showing by a plaintiff in a products liability case to ever make out an issue to submit to a jury on punitive damages, if you can do it at all, but certainly in this case shows no more than compliance with regulations and specifications and any negligence that may be shown, any breach of warranty is at most of a general nature, and there is nothing about it that shows any quality of willfulness or anything else. And that would be the bare minimum that you would have to show. So I am taking punitive damages out of the case altogether.

* * *

(p. 346) The Court: The defendant's motion for directed verdict on the floatability aspects of the case is granted. Reasonable and fair minded people couldn't differ as to that aspect of the case because it is uncontradicted on the physical facts and everything else that the plane while going at a speed of 45 to 55 knots basically impacted the water, and while the Captain Tussing did testify that he had exerted as much force on the collective stick as he

could, he ultimately got that in the up right. That in no way seemed to have diminished the force with which the craft actually hit the water. And not only that, according to the uncontradicted evidence the tail end section of the craft departed somewhere along the line. And there is nothing to (p. 347) prevent water from coming in there. The bubble on the co-pilot's side, there has been no direct testimony that that bubble actually ruptured in the crash. There is from the pilot's side. And I probably, if you really wanted to strain you could say you could infer that it burst, but it could have come out during the removal of it. But I am not satisfied that there is any evidence on it that would basically permit me to let a jury speculate as to whether it was ruptured in the original crash or not.

Now, on the location of the co-pilot's escape hatch, I am going to submit that to the jury simply because the testimony is that when the collective stick is in the up right, that it may interfere with access to the release handle on that door. And I believe Captain Tussing testified that he had succeeded in getting the collective stick in the up right. So it would be in the one position that made it most awkward to activate the release handle. I will let that go as a factual issue to the jury.

* * *

(p. 349) Paul Packman testified as follows:

DIRECT EXAMINATION

By Mr. Franecke:

Q. Again, in accordance to Your Honor's procedure, Dr. Paul Packman has his Bachelor of Science Degree in Mechanical Engineering from the Cooper Union for the Advancement of Science and Art in New York City. Mas-

ters Degree in Metallurgical Engineering from Syracuse University in 1962.

Doctorate in Solid State Science and Engineering in 1964 from Syracuse University.

At the present time he is Professor and Chairman of the Department of Civil and Mechanical Engineering at Southern Methodist University in Dallas, Texas and has held various and other both academic and industrial positions throughout his rather lengthy career.

He has served as on the Advisory Board of many of the both military and civilian Aeronautical and Aviation bodies such as National Academy of Science, NASA, A. I. M. E., United States Air Force, U.S. Army and also private industry.

He is author of at least over 50 publications as I count them dealing with the area of engineering, metallurgy, (p. 350) fracture and related civil and mechanical engineering, as well as many other actual contributions to industry and the sciences of a direct and practical nature.

The Court: And you are offering him as an expert in which discipline.

Q. With regard to the discipline of mechanical engineering and metallurgy pertaining to the AFCS roll servo and its hydraulic and metallic systems?

The Court: Well, ladies and gentlemen, my prior ruling on expert testimony is in effect with Dr. Packman. He will be permitted to express his opinions in the areas of the discipline just mentioned by Mr. Franecke, and you will accept those opinions as proper evidence in the case. Proceed.

Q. Thank you, Your Honor.

Dr. Packman, would you state your name, please?

A. Paul Packman.

Q. Doctor, you have already heard the information I have given in a brief sketch of your academic and industrial background. I would like to ask you, Doctor, in the field of hydraulics can you explain to us to a certain extent what is hydraulics?

A. Hydraulics is an awful lot.

It is, you teach an undergraduate courses in hydraulics. Fluid, static, fluid dynamics, hydraulics as a (p. 351) applied to controls. I have taught a controls course, how do you use hydraulic valves to control, to control various operating systems.

It depends on where you want to use hydraulics as a—

Q. What is the basic principal in hydraulics? Why are they utilized in things such as power steering on cars and airplanes?

A. Well, you have two things. One is that the oil is essentially incompressible and will transmit forces. The other thing is that servo hydraulics or electro pneumatics hydraulics is that you can control large forces with very small inputs.

Q. Why is that?

A. What you have is that you have a large power piston system which can be controlled by various small movements of the servo valve or the control valve, or in this case it is called a pilot valve. So little motions of a—

little motions of a very small valve with very small loads on it can cause changes in hydraulic flow that essentially result in large force outputs.

Q. Is there a way of illustrating that as to how a small valve such as we have in this case can actually move a much larger valve?

A. Yes, sir.

Q. How would you do that?

(p. 352) A. Well, you have to go through essentially a lecture explaining or demonstration or something explaining how the hydraulic system works with a servo hydraulic system.

Q. All right. Well, let me ask you—

The Court: Members of the jury, you basically understand the principal of hydraulics, don't you?

I think it is counter productive to really give a seminar on that subject, except in a general sense.

Q. All right. Let me relate it then to this particular case.

You have had an opportunity to review various documents, have you not, related to this case?

A. Yes, sir, I have.

Q. What documents have you had an opportunity to review?

A. Well, I have been provided with a number of documents, including the—well, let's see. One of them is essentially a naval air rework report concerning the accident and the subsequent teardown.

Another one of which is a series of Sikorsky documents requesting a change in the servo valve assembly system to improve the reliability.

A third document is the military specification Mil. C. 18244 A., which is the control stabilization system.

Another document is the drawings that were provided, copies of drawing that were provided to me about the servo (p. 353) control system.

An article that was in the May 1969 Digest of U.S. Naval Air Weapons Systems, which is essentially a brief overall review of the automatic flight control system. Another document that I recall was a document done on mechanical advantage linkages of this flight control system.

Q. I see. Mr. Clerk, may I have the volume that would contain Exhibit 86, please?

Doctor, I ask you to look at Exhibit 86 and ask if you had been provided that particular document, also, the military specifications for helicopter flying and ground handling qualities general requirements.

A. I believe either I have been provided or I have something similar to that in my own files.

I don't know if I have been provided with all of this, but I have something similar to this in my own files.

Q. All right.

Now, Doctor, we have there up on the board a schematic of a AFCS roll servo. Have you seen that schematic before?

A. Yes, sir.

Q. All right. You were talking about this question earlier about a small valve being able to control a smaller valve. Is this the case in this particular type of servo?

The Court: Didn't you misspeak? A small valve controlling a larger valve is that what you mean.

(p. 354) Q. A larger piston, yes.

The Court: Larger piston.

Q. That is correct.

A. Yes, sir, that is a very good example of a servo.

Q. Can you explain in that schematic then what you mean by that smaller valve controlling a larger piston? And if we may, can we—

The Court: If you had the real servo, why wouldn't that be better?

Q. We can use that, too.

A. It is easy to trace the hydraulic flow, Your Honor, through it rather than the servo. You can't see it in.

The Court: All right. You may run before the jury, then.

Q. Thank you.

A. This is pretty much a—this is the actual flight control servo valve. And it is really complicating. What you have to do is you have trace hydraulic lines through it to see how it operates.

I think what I can do is to take these pieces as I draw them to sketch them so you get a simplified idea of where the flow is going and what is essentially happening to it.

There are in actuality, there are three separate systems just contained on the left half of this drawing. (p. 355) There is the pilot valve, there is the power valve, there is the sloppy link. You have to understand how each of these things contributed.

So what I am going to do is just sketch this portion of it and show—

The Court: The pilot valve is the Moog valve?

Q. Yes, sir.

The Court: All right. Fine. Because I want the jury to know that you use the words interchangeably.

A. Well, pilot valve. Moog valve is a particular brand name of a servo travel.

The Court: All right.

A. But this is—and what you have is really you have two separate valving systems.

This valve system here is the Moog valve, or the pilot valve.

And then you have the main power cylinder sitting like that.

So what I have drawn up here is the pilot valve or the Moog valve, and down here is the power valve.

If you have no hydraulics, in other words if you have no fluid flow at all, when the pilot puts an input here by virtue of this linkage you can get an output. So the pilot, the pilot linkage can push on the pilot input, everything is stiff and it rotates essentially and you can get a power (p. 356) output with no hydraulic operation at all.

But you have all of this in here is filled with hydraulic fluid. Fluid so when you put a pilot input in at this point you have to circulate fluid on other side of the piston otherwise it will essentially lock the system. So you have this things called the by-pass valve. What that does is when there is no hydraulic, this essentially pushes open and flow goes from one side of the cylinder to the other side of the cylinder. This one over here on the right is shown open. You can see there is a complete passage. So with no hydraulics whatsoever, you have a direct link to the pilot through the piston to the controls of the helicopter.

Now, the pilot valve or the control valve is the little valve compared to the big power valve. It also you can see moves back and forth, but the area of this pilot valve is much smaller than the area of this valve, so that the stress or the load that is on this valve is very much lower than the load that are on this valve.

So if I did nothing but push or pull on the pilot valve, it slides back and forth and let's the oil inlet which is coming out of P. One, comes down through the middle and it can go either to the left side or to the right side of the pilot valve depending upon where the position of this little pilot valve is. It just moves very slightly back and forth.

So, for example, if it is coming in this particular (p. 357) case, if it comes through the middle up through the middle, and the valve is in the right position, what it will do is it will come down through—it will come into this left chamber of the pilot valve, go down through and enter into it. By virtue of the way it is set up, it will enter into

the right chamber of the piston and drive the piston back this way.

Q. Will it continue to do that, Doctor, as long as the small moog or valve on top is in fact in that open position?

A. Yes, sir. In other words, it will keep—it will essentially—the flow of the oil will be from P. One through this section into the left chamber of the pilot valve, through the opening into the right chamber of the power valve, and that power valve will keep going that way until such time as you close it off, and essentially, you essentially get equalized—you get oil in both sides and you have no oil flow. Because when the oil is coming in through the right side of the power chamber moving this way, this oil has to go some place, and it can do one of two things. If this by-pass is closed, it has to come back out through the left side of the power valve through this chamber into the right side of the pilot valve, and then it comes out into R. Two.

So it essentially goes out here into here, and then goes essentially back out to R. Two. So it comes in, comes (p. 358) in, comes in here, goes around through, goes through in this particular case it goes through here. The oil from this side comes back out, and that will keep going as long as that valve is in the right position.

Q. Let's assume something here. Let's assume that we have a pilot input. What would happen to the small pilot valve if the pilot is in fact moving where it says here, pilot input, what happens up there?

A. Now, it gets very complicated. I kind of wrote this down because you have all of these linkages that are operating.

What this system is, is essentially a self-stabilizing system. Let me see if I can explain it.

You put the pilot input over here, and what happens is this main piston has not moved, so this is fixed. And you push it, and what you do is you move this sloppy link to the right. That sloppy link is connected to this second linkage so that these 2 linkages, which is the left most link which is standing vertically and the flex to left-most link which is standing vertically moves at the sloppy link position towards the right.

The second most lever to the left is pivoted at this point so that the input to the pilot valve moves to the left.

It moves to the left and it opens up the oil flow into the right chamber of the pilot valve which essentially goes (p. 359) into the left chamber of the power and it drives it—it drives the power cylinder to the right.

So what if the pilot goes to the right, this thing ends up going to the right with all of the reversing linkages.

Now, the minute this power cylinder starts to go to the right, this left corner pivot is no longer fixed, and this moves forward and it rotates about the pilot's input linkage and this sloppy link moves now to the left, it moves with this second link here, which rotates. So therefore this top piece now moves to the middle position. So the sequence is that the if the pilot inputs something to the right, the power system through the pilot valve moves to the right, and then because of the sloppy line changing

the fullcrums, the pilot valve centers itself and it stays fixed in that position until the pilot gives a secondary input. That is the normal operation.

So if the pilot essentially says he wants to go to the right, he puts some right input, the system operates, he gets power out making the helicopter go to the right, and it will stay in that position by virtue of the hydraulic balancing until he wants to move it back to the center. And that is how—that is physically how this system operates. It has this extra—it has a couple of safety features that are designed in to it there were two separate servo valves, and (p. 360) the whole system will operate completely independently off of two separate servo valves. It has two bypass valves. And—

Q. Okay.

Let me add another factor to what we are talking about here.

Let me add this picture that is from Exhibit 13, which is an exterior picture, so to speak, of Exhibit Number 1. Defendant's Exhibit 1, the actual physical representation. I would like to ask you, doctor, what then is the function of the shear pin in this area of the servo?

A. The shear pin is essentially designed that it is supposed to shear, like a break away. Essentially like a shear pin in a motorboat. When you go over a—when you go over some weeds or something of this nature rather than break the propeller it is supposed to break loose.

So if that breaks loose, what happens is that you have no control from the pilot valve and you essentially just have straight input mechanical into the power system.

It is a safety feature that is designed in to eliminate the possibility of external forces being put into the pilot valve.

Q. If the shear pin will work, if in fact the pilot is capable of exerting force to shear the pin, is that correct?

A. Yes, sir, there has to be—some mechanical forces has to be applied, enough to essentially shear the pin exactly like (p. 361) a motorboat.

Q. I see.

A. Driving pin on a motorboat.

Q. Let's take a different situation.

Let me ask you what would happen if the pilot without the pilot's input, if the moog valve or that pilot valve is in fact stuck in a position one way or another due to some internal jamming or wedging? What would happen?

A. Well, if it is stuck in a particular position you have the oil flow going through that valve and entering into the power cylinder. The power cylinder is moving, the flow is coming back out through the other half of the pilot valve, and there is nothing to—normally what would happen would be the linkage would make that valve move back to a zero position to essentially lock the power valve in whatever position it was supposed to be in.

But if you can't—if that pilot valve is stuck, in other words if it can't slide back and forth, there is nothing to stop the flow of oil through the pressure to the return, so therefore the power cylinder has to keep going until it essentially bottoms out on the—on its cylinder. There is nothing to stop it from going to its fullest extent.

Q. It stays in one position to its fullest extent?

A. Well, it is driven. It is driven by the pilot valve all the way to its fullest extent in whatever direction it is (p. 362) stuck in.

Q. Well, what if the pilot doesn't want that? What happens if the pilot wants to fight against that particular thing? What would he need to do?

A. Well, you are talking about the fact that the pilot valve is stuck, now?

Q. Oh, on the assumption the pilot valve is now jammed or stuck in some manner.

A. Well, he can—what happens is the stick goes—in other words, he has no way—he can't control the stick, it just wants to keep going because that is attached onto the pilot's input?

He can haul back on the stick, and if he can do that he can either break the shear pin and therefore that system—well, even if he breaks the shear pin, that doesn't count because that is damaged, so breaking the shear pin wouldn't do any good.

Q. This actually has two different systems, did it not?

A. Yes, sir.

Q. One on one side and one on the other, and they are independent, is that right?

A. Yes, sir, they are.

Q. There has been testimony this morning that you would have to switch from one side to the other to be able to shear the shear pin. Is that consistent with what you have just (p. 363) been speaking about?

A. Yes, sir. If you switch—if you switch to the number two servo valve and use the forces back through from the number two servo valve being applied in the opposite direction you might be able to shear the pin. It depends—it depends on the forces that are available to you at the pilot valve.

Which I don't think—well, I don't know. I don't know what the exact numbers are. It seems—the difficulty in switching to the number two servo valve is that the number two servo valve is connected physically to the number one servo valve through this mechanical linkage, and what is—if this one is stuck, this one can't move. In other words, these—the left and right servo valves essentially move together. So that you would have to use this one in opposition to this one in order to get enough forces to shear the pin.

It is difficult, at best.

Q. The pilot would then in essence also be having to work against the force of the power piston in the hard over position, is that correct?

A. Well, he has got to do really three things.

He has got to haul back on the stick to get it to fly the helicopter. And simultaneously he has to switch over to the second servo valve to apply forces to possibly cut the (p. 364) shear pin.

Q. In this case there has been further testimony that the normal force that the pilot has at his cyclic is something in the order of magnitude of 14 ounces when the servos are turned on. But that if the pilot valve is jammed, the force is something like 55 pounds. Are you familiar with those numbers?

A. I recall those numbers, yes, sir.

Q. Is that consistent with what you are indicating here with regard to the requirement of the force in this type of a system?

A. Yes, sir, because what happens is you don't get any—the pilot valve is not moving, so that no hydraulic assist to move the power valve. In fact, you have got to work against the pressure that is being forced through the pilot valve to the power valve in order to reverse the direction. So you have got—yes, it is a lot of force that has to be applied in order to work against the hydraulic pressure that the stuck pilot valve is providing.

Q. Do you also recall various governmental specifications, and I think specifically Exhibit 20 and 86, with regard to what the military specifications are for the maximum break out force or force that would be necessary for the pilot to free up the valve?

A. I don't recall the exact numbers, but I realize that, (p. 365) you know, the government does provide for manual over rides of the hydraulic system that imply that if you have enough time and your relax time is such that you realize what you have got you can essentially get your hands on the stick and manually over ride the pressure valves. And they are on numbers that are provided on that.

Q. May I show you then as Exhibit 6 the government specification pertaining to this particular matter.

And refer you to paragraph 3 point 2 point 7 at the top. Top right.

And the numbers down below.

A. Yes, sir.

Q. Do you recall reviewing this particular document?

A. Yes, sir.

Q. And what is the lateral or roll cycle limit control force for break out?

A. 1.5 pounds.

Q. And the limit of the control force?

A. Limit of the control force is seven, so a maximum you would have is seven to eight and a half pounds.

Q. You have, it takes a minimum of 55 pounds to work against a jammed moog valve. Is that note in conformance with this government specification?

A. Well, this is—this is with the power off, and this is how much it takes to move the cylinder with the power off.

(p. 366) The 55 pounds is clearly in excess of the amounts of break out limit forces, and the reason for it is when that piece gets jammed in there, you work—you have to work against the hydraulic system in order to control the airplane. The hydraulic system is working against you.

Q. I see.

Doctor, you were also provided various information about the dimensions and the type of metal which was found in the actual Moog valve involved in this case, were you not?

A. Yes, sir, I was told what those type of metal—what type of metal was.

Q. It was ten ten steel, I believe?

A. Yes, sir.

Q. Based upon your metallurgical background, can you tell us something about what ten ten steel is?

A. Yes, ten ten means a plain carbon steel with point ten points of carbon, which is point one percent carbon.

It is a very easily obtainable alloy milled steel.

Q. I see. As steel goes, it would be considered relatively soft?

A. Yes, sir.

Q. And malleable, so to speak?

A. I think, for example, norris wire is ten ten steel, ten ten steel.

Q. In this particular case in your review of exhibit one (p. 367) which contains Mr. Fox's report it indicates that—a distortion at the end of the wire that was found in the Moog valve. Would this have any significance to you with regard to the scenario of a jammed roll servo with the pilot being unable to recover an aircraft?

A. Yes, sir, it would.

Q. Why would it have that?

A. Well, as I understand it, oh, there it is, the piece of wire was found in the pilot valve. And the dimensions and the shearing that he is talking about are associated with that piece of wire essentially jamming that pilot valve so that the hydraulic system would not center and it would keep driving in one particular direction. And he describes it as being a flatend piece of wire which would be consistent

with somekind of force being exerted on that in the close confines of that pilot valve.

Q. Is that type of metal—would that type of metal be consistent to be flatend or distorted in a wedging type motion stopping a valve such as this?

A. Yes, sir, it could—it could very easily get plastically deformed in jamming.

Q. What do you mean by plastically deformed?

A. If you take a bobby pin, which is a ten ten steel, and if you hold it and bend it down a little bit and release it it springs back to its original position. That is called (p. 368) elastic deformation. If you take the bobby pin and you bend it it will deform, and when you hold it up it has a bend in it that is called—in other words, it is permanent plastic deformation, it is non-recoverable.

And what you are doing with the bobby pin is, for example, is just bending. And if you took that piece of metal and you squeezed it like you try to squeeze it between something, before it broke you would see some plastic deformation which is consistent with the type of loading that the piece of wire had. This from Mr. Fox's description appears to be a shearing action.

Q. All right. Also, Doctor I would like to show you as you referred to Exhibit 20. This is a Sikorsky report that this—this Sikorsky report is S. E. R. 56010 automatic flight control systems detailed specifications. Do you recall reviewing this particular document, and this is in particular page 8?

A. Could I see the one page?

Q. Yes.

Q. I want to make sure. All right. Let me ask you. This document, Exhibit 20, in paragraph 3 point 3 point 1 point 6 has a specification with regard to over ride provisions. Would you please look at that paragraph at this time.

A. Yes, sir.

(p. 369) Q. And the next paragraph, 3 point 3 point 1 point 6 point 1, over ride forces?

A. Yes, sir.

Q. Where it says that the over ride forces shall not exceed the following values in the worst malfunction of the AFCS.

A. Yes, sir.

Q. What order of magnitude is Sikorsky indicating that in their specifications under the worst malfunction of the AFCS would be, what order of magnitude of force?

A. It says 30 pounds at the yaw pedals. But if they have to follow the pedal specifications, they can't get more than seven pounds.

Q. More than seven pounds?

A. What they are saying is that the worst malfunction of the system should not require more force to override it than the pedal specifications for over ride.

Q. Based on the testimony that has been presented in this case of 50 to 55 pounds being required and that the shear pin will not shear except if you switch systems over to the other parallel system, and based upon your education and your experience and the documents that you have reviewed, would you render an opinion that if this servo exceeds—

Mr. Booker: I object to what his opinion would be, and ask if he would render it.

(p. 379) Q. What is your opinion as to if it requires 55 pounds to overcome a malfunction of the Moog valve, if that would be in fact a negligent and a defect in the design of the servo?

A. Well, my opinion is that if it requires 55 pounds to overcome this particular malfunction of the flight control system that Sikorsky didn't consider that type of malfunction in their design for the over ride, and therefore it was not considered as being a malfunction of the AFCS. And they assumed that the worst malfunction that Sikorsky could come up with would be over ridden at seven pounds and this one takes 55 pounds to over ride, so it was not considered in the design of the safety system for the AFCS.

Q. And this would not be dependent upon where that particular piece of metal came from, it is just a question of the metal is in there, is it not?

A. Well, it has to get into a particular spot in order to do what it is doing. Now, in other words, it wouldn't matter where the metal came from as long as it got into that particular place. If it was in other places, it wouldn't cause that same 55 pounds over ride. It has to be in that one particular spot.

Q. Okay. I think that is all I have at the present time.

The Court: All right. Any cross-examination?

Mr. Booker: Yes, Your Honor.

CROSS EXAMINATION

(p. 371) By Mr. Booker:

Q. Dr. Packman, before you began to prepare for your testimony in this case had you ever dealt with this particular kind of servo before?

A. You mean this double-acting servo?

Q. This same kind of servo for this aircraft?

A. No, sir, not for this aircraft.

Q. You are generally familiar, though with principals of servo mechanisms?

A. Yes, sir, I have worked on a number of servo mechanisms.

Q. Have you actually ever seen one of these servos in the flesh?

A. No, sir.

Q. Would you know whether the exhibit over on the clerk's desk is one of them?

A. No, sir, I wouldn't.

Q. Have you ever actually handled the controls of at CH-53 D. Helicopter?

A. No, sir, I have not.

Q. Was any of the information which came to your attention addressed to the contaminant levels in these servos?

A. Yes, sir, there were some discussion in Mr. Fox's report about contaminants in the oil.

(p. 372) Q. And is that the same oil that goes by the pilot valve you have just talked about?

A. Yes, sir.

Q. Do you remember what classification that was?

A. Let me see if I can find it. I don't recall off hand what classification it was. I would have to look—if it is contained in Mr. Fox's report as to what level the—

Q. Are you familiar with the Navy categories for levels of contaminants?

A. Not off hand, no sir.

Q. What is supposed to keep contaminants from getting into the system?

A. Well, you have got a number of filters in the hydraulic system in the hydraulic line.

Q. And do you know whether when a servo—when a servo has its hydraulic fluid renewed the device from which it receives the hydraulic fluid is also supposed to have filters to filter out materials?

A. Yes, sir, I am aware of that.

Q. Did you in your studies observe that the primary servos on this helicopter had some chips of metal found in their hydraulic fluid which were in excess of the size of the chip found in the Moog valve on this servo?

A. That is correct. I recall reading that, yes, sir.

Q. And do you recall reading that there was no trouble (p. 373) with the primary servos?

A. Yes, sir.

Q. And do you make any distinction as to why larger chips would create no problems in the primary servos while the smaller chip may have created a problem in this servo?

A. Yes, sir, I do.

Q. What is that?

A. Well, you have to get it in the exact wrong place in order for it to cause trouble. I think I said that if it wasn't in that pilot valve and it had not jammed in the pilot valve you wouldn't have had any problem. It probably was in the pilot valve for an awful long time and didn't cause any trouble. It just had to get in the exact wrong place to jam that valve in a particular position. If it had jammed, for example, in the neutral position, nothing would have happened.

Q. But there is no way you can tell just from the papers that you have studied how long it had been in that location, or indeed whether in fact it had been actually—

A. Well, there are two parts to that.

I read from the information that the wire was taken out of the pilot valve or the Moog valve when it was disassembled after the accident.

I read further that it was—that when looking at it under a scanning electron microscope it was flattened, which (p. 374) implies a shear force to it.

I read further that there were contaminants, metal chips in other places of the hydraulics, but that they were assumed or they were associated with normal wear of the hydraulics.

It seems to me based upon my background that the only way a chip that large could get in to the Moog valve is when the Moog valve was disassembled, because it seems very difficult that for them to pass through the orifices in the valving system without causing some erratic behavior of the hydraulic line beforehand.

So, the answer to those two questions are, as I think it was in just exactly the wrong place and it had to be there when it was disassembled. I don't think it was introduced by contaminants in the oil system.

Q. Are you familiar what is done when the power piston is removed from this servo for the purpose of servicing the power piston?

A. Well, I am aware of what happens. I mean in terms of disassembling. I mean, I know from my background in terms of what happens to hydraulic systems when you disassemble them, yes, sir.

Q. Have you ever actually seen the power piston on this kind of a servo removed?

A. No, sir, I have never seen this—physically never (p. 375) seen this particular system before.

Q. And so you have no idea as to how large an orifice is created when the power piston is removed or what could get into that area when the power piston is removed?

A. That is correct.

Q. Did you observe that the shear pin on this aircraft had not been sheared?

A. I didn't observe it directly.

Q. But did you read that in the reports?

A. I believe I did, yes, sir.

Q. What significance do you attach to that?

A. Well, it says that the first line of redundancy of the system which would enable the pilot to put mechanical input to shear the pin and switch over to a non hydraulic control didn't operate.

Q. And do you know what forces would be necessary to shear the shear pin?

A. I recall, whether I was told or reading somewhere, something on the order of 25 pounds.

Q. And did you also read that when the shear pin was actually tested at Pensacola Navair that while it was found to be intact it sheared properly?

A. I believe I read something of that sort, yes, sir.

Q. Are you familiar enough with this aircraft to know whether it has a dual AFCS system?

(p. 376) A. When you say dual, it has dual—this particular system is a dual system.

Q. And do you know what would be required to switch that over to the other system, what was required for the pilot to do?

A. Yes, sir. There is a button on the control panel that will switch from one to the other.

Q. And if in fact the pilot did not attempt to switch that, do you have any idea what would happen?

A. If he didn't?

Q. If he did not.

A. I don't think it was ever attempted to switch. I don't think he had time. But what would happen would be he would continue to get this. He couldn't move the stick unless he applied more than 55 pounds of force.

Q. And suppose he had switched to the other channel?

A. If he had time to switch to the other channel and he had switched to the other channel based on Sikorsky's operation he would have been able to I believe get the 55 pounds to either do one of two things. Either to shear the shear pin and get switched over to full manual, or essentially break the jam in the number one servo valve or pilot valve.

Q. Have you ever actually seen the chip that was involved here?

(p. 377) A. No, sir.

Q. Have you even seen any photographs of it?

A. No, sir.

Q. Did you read about the dimensions of it, did you not?

A. I read two—yes, sir, I did.

Q. Do you recall what those dimensions were?

A. My notes say that the original dimensions were approximately a tenth of an inch long and approximately 15 thousands of an inch in diameter, but that was an average number, that it was flattened on one side and it was bent on another side.

Q. And does that Moog valve have a piston which moves back and forth inside a cylinder?

A. Yes, sir.

Q. Without over simplifying it, is that about how it works?

A. That is just what it does.

Q. What is the tolerance, if you know, between the cylinder and the valve which moves back and forth?

A. You mean the O. D. of the piston versus the I. D. of the cylinder? I don't know specifically. They are in this, but usually on the order of a thousandth or ten thousandths of an inch if there is no seals on it.

Q. And assuming—

A. Very, very, close tolerance.

(p. 378) Q. Assuming the tolerance is one ten thousandths of an inch, could a chip the size that you read about get in between the valve and the wall of the cylinder?

A. No, it would have to get jammed between, for example, an orifice and one of the sliding protuberances on the piston.

Q. There simply isn't enough tolerance for it to get in there?

A. Well, it can't get—it can't get physically between the cylinder, the piston and the cylinder wall, but what it does is it gets jammed in the open space between the two—there is three parts to the cylinder. And there is a lot of clearance in the two middle parts of the cylinder, and it could get jammed in between there and one of the outlet lines in one of the outlet orifices.

Q. If it got jammed into an outlet line, it wouldn't affect the operation of the cylinder, would it?

A. All it has to do is stop that cylinder from moving back to zero position, and it just keeps on going the power source keeps on going.

Q. Do you know at what frequency that little cylinder in the Moog valve oscillates?

In normal operation let's say, normal flight operation?

A. No, sir. It depends upon the servo valve frequency, (p. 379) which is the electro hydraulic drive driving.

Q. Do you know what that is?

A. No, sir, I don't.

Q. Did you make any determinations what force it would take to shear this chip that was found?

A. No, sir. I didn't.

Q. Did it appear to you from looking at it that the chip had failed in a single shear?

A. I can't answer that because I never saw any photographs of the wire, so I really can't say how.

Q. You don't know how it failed?

A. That is correct.

Q. If it failed.

A. Well, I don't know how it failed, and I don't know if it failed at all. I don't know if the wire failed at all.

Q. Now, a jam or an obstruction in the pilot valve such as you have described here today isn't the only thing that would have a pilot valve malfunction, is it?

A. Well, I read from Sikorsky that some of those Moog valves were stress cracking and were causing various

similar flight operations, and that was one of the requests to the Navy I think to re-design that. But that is not—the answer to the question is, no, that is not the only mechanism that would—that has been known to cause that Moog valve to jam up.

(p. 380) Q. Indeed, could an electrical impulse cause it to malfunction?

A. It is possible, yes, sir.

If there was no centering—in other words, if there was no centering to the AFCS input solenoid, and it didn't allow that valve to return back to zero.

Q. Are you familiar enough with servos generally to know whether that is the type of servo which is in general use in this country aboard military aircraft?

A. Well, Moog valves are almost like Jello or Hershey bars, they are very commonly accepted things. They are used in an awful lot of drive hydraulic systems, so the answer to your question is, yes, they are very common, servo Moog valves are very commonly used in the aircraft industry. They are used in the materials testing industry, they are used in an awful lot of places.

Q. Based on what you have learned about this particular servo, does there appear to be anything unusual or exceptional about its design or use?

A. No, I think it is very sophisticated. That sloppy link is a very nice idea.

Q. Sloppy link makes it sound as if there is something wrong with it. What does sloppy mean to a mechanical engineer like you?

A. Well, it is sloppy in the sense of what it does. It (p. 381) takes up the slack and allows the system to be automatically self stopping when it is operating properly.

It is on, and yet if you lose hydraulics, it locks itself up and it becomes the pivoting mechanism to allow the pilot input. It is a very cute idea.

Q. If this Moog valve were to be jammed in the open position, what would that do to the power piston?

A. When you say open position, you mean so that fluid is flowing from—

Q. Yes, yes.

A. Okay. If it is open, essentially what happens is that the fluid flow continues to go from the inlet line to the power piston, the opposite side of the power piston, and then the fluid that is being compressed then comes out through the opposite side of the pilot valve and goes to the—goes to the return line.

Q. Wouldn't that cause the shear pin to fail?

A. It could if it—it depends upon—if the system is jammed and you can't move that pilot valve, what it is trying to do is it is trying to rotate about its rotational position, which is that fixed link. And just depends upon that linkage arm as to whether you have enough forces to shear that shear pin. It is possible that it could occur that way, yes, sir. A shear pin is designed to fail at that point.

(p. 382) But it didn't fail at that particular place.

Q. You have been asked to look at an exhibit up there on the board. I believe you had not seen that before today, is that correct?

A. Well, I have to apologize, because I have seen so much material over the course of a number of years on hydraulics that I didn't recall if I had seen that before or not. So I really couldn't answer whether I had seen that specifically or not.

Q. Do you know whether that applies to the cyclic control axis?

A. No, sir.

Q. Are you able to say?

A. I don't recall anything more than just—

Q. It only refers to the collective and the yaw, doesn't it?

A. Yes, sir.

Q. Not the cyclic?

A. Not that I know of.

Q. You have not made any calculations, have you, to determine what forces it would take to shear this particular particle as described to you if it was of the consistency as described to you?

A. That is correct, I have not.

Q. You have mentioned a force of 55 pounds, and what do (p. 383) you understand that force to be?

A. Well, the best of my recollection Sikorsky made some tests in which they purposely stuck pieces of wire in to the system and determined how much force was required in order to shear a wire of this consistency. That is where that number comes from.

Q. But that is the force necessary to resist the power piston rather than the servo valve, isn't it?

A. I don't understand the question.

Q. Didn't you understand that the 55 pound force was meant to relate only to the force on the power piston without any assist one way or the other from the servo valve?

A. No, sir. The numbers that I am recalling was that the hard overs, the hydraulic hard overs depending upon which control channel, it would go anything between 50 and hundred pounds, and it is my recollection that the 55 pounds was associated with the amount of stick force that had to be necessary as a pilot input in order to shear a piece of metal which was simulated as being in the Moog valve.

Q. But that, that was not—again, wasn't that relating to the force on the power piston itself? Wasn't that assuming that for some reason the servo valve wasn't working?

A. My understanding of what that was that was how much force had to be applied at the stick, the pilot stick, in order to get through the linkage mechanism, whatever force (p. 384) was required on that pilot valve to shear that particular valve.

Q. Was not your understanding that that was the force it would take to operate the system without any benefit of any servo assistance?

A. That was the force required to override the jammed piece of metal. I would assume that if Sikorsky is designing this correctly, that overriding the override

normally expected, hydraulic failures would not be more than the specification called for by the government. It was like one and a half pounds or possibly seven pounds, but in that order of magnitude, not 55 pounds.

Q. Now, let's switch things for a moment.

Let's suppose that somebody had dropped a screwdriver, a mechanic while working on the servo had dropped a screwdriver in such a way that you simply could not move the power piston.

A. The power piston?

Q. Well, let's assume that it had been dropped in such a way that one of the servo valves simply would not operate.

A. Well, those are two different things.

Q. Well, take the servo valve first.

A. Okay.

Q. Let's assume that the servo valve simply would not operate because of some mechanical problem that had been (p. 385) created by somebody servicing it.

A. Yes, sir.

Q. At that point what force would be used to control the aircraft?

A. Well, at that point you shut off all the hydraulics and all you would have would be mechanical input from the pilot input straight through to the power piston, and both by-pass valves are open. So you are operating completely manually.

Q. Do you have—you don't have any idea what force that is?

A. No, sir.

Q. But the aircraft could still be operated, couldn't it?

A. Yes, sir, aircraft are operable with hydraulics off. They are a little stiffer, but they are operable with hydraulics off.

Q. And so had this hydraulic system been off completely at the day of the accident it still could have been operated?

A. I don't understand what you mean by off completely. At what point? Suddenly off.

Q. I believe you said, or didn't you, that the aircraft was still operable with the hydraulics off completely?

A. Well, I recall that the Army helicopter command used to have in training—they used to fly—they used to fly Bell helicopters specifically with hydraulics off so that the (p. 386) pilots would know how the plane responds with hydraulics off.

So that if they—so what I am driving at is the airplane would be controllable with no hydraulics whatsoever.

A. Just mechanical inputs to the flight controls.

Q. It is not designed to fly that way, but it will fly that way?

A. I think it is designed to fly with hydraulics off, but it is much easier to fly with the hydraulics on. But it is designed to fly both ways is the best answer.

Q. Aren't these forces that are called out in the manual the forces that one would expect to encounter under normal flying circumstances?

A. No. I think—I don't know the answer to that question.

Specifically, no, I don't know the answer.

* * *

(p. 388) A Juror: Your Honor, I would like to know what the size of the filter is, the material that is normally used in a system like this.

The Court: You mean the screen of the filter?

A Juror: Yes, sir.

The Court: Do you know that, Dr. Packman?

A. I don't know specifically what this one is, but the screens are exceedingly fine, much, much finer than window screens.

The Court: Does anyone have that? Do the specs call for that?

Mr. Franecke: In the order of five microns is one of the filters. Very small.

The Court: Does anyone have one that is an exhibit?

Mr. Franecke: There was in fact testimony I believe by (p. 389) Mr. Fox this morning that the screens were in fact intact in this particular roll servo. I believe, I am sure there will be testimony as to what the size of those screens are from the defendants. Very small.

The Court: All right.

But, can you relate it to something that the jury—it is smaller than normal screen wire.

A. Much, much smaller than normal screen wire.

The Court: Smaller than a milimeter, much smaller?

Mr. Dixon: It is not—

A. It is exceedingly fine. It almost looks like a solid piece.

Mr. Franecke: Perhaps if I may ask the question.

Knowing what you know, Dr. Packman, of the dimensions of the chip that was found in this particular servo, would it be capable of passing through the screen that you are referring to?

A. Not at all. No.

Q. Could it pass through, and if it did would it leave a hole that would be recognizable?

A. I think they are stainless.

Q. If forced through?

A. It would have to leave a hole.

Q. All right.

* * *

(p. 390) The Court: One of the orifices that the hydraulic fluid goes through, would the chip pass through that?

A. It is possible if it went—I don't know specifically the size of the orifices in the pilot valve, but I—it is

possible if it went straight up, but it would never make the curves in the system. It would get jammed in there some place. But it is possible to get through one of the orifice. But it would be flushed out.

* * *

(p. 392) Mr. Booker: Secondly, Your Honor, at this point we do move the court for a directed verdict on all issues.

And I wish to be heard on that.

* * *

(p. 395) So on all those grounds, Your Honor, we urge that the court direct a verdict for the defendant.

The Court: All right. Thank you.

I don't need to hear from the plaintiff.

(p. 396) On the question of contributory negligence, it is a pure jury question as to whether the descendant exercised reasonable care under the circumstances. He was caught up in a reverse form of error estremis. That is peculiarly a jury question for them to decide whether he used reasonable care under the circumstances.

Basically the evidence now shows that Sikorsky worked on this in the first quarter of 1982 and the chip could have been inserted or it could have gotten in it during whatever drill they put it through at that time. So there are jury questions on the implied warranty of merchantability evidence of express warranty. I will submit that to a jury. And then on the negligence of design or negligent design, is a component part of an implied warranty of merchant-

ability under Fourth Circuit law. I just charged two or three jury's to that effect, and I will give counsel a copy of the charge that I normally give. I am not so sure that you want a negligence count to go to the jury, but if you do, I will consider that. But before I will show you what the charge will be, if that goes out of the case and it just goes to the jury on the implied warranty of merchantability, you don't have a contributory negligence instruction to begin with.

* * *

(p. 397) Thomas P. Dixon testified as follows:

DIRECT EXAMINATION

By Mr. Booker:

Q. We have designated Mr. Dixon as a expert witness. May I give a brief resume.

The Court: Yes.

Mr. Booker: Ladies and gentlemen of the jury, Mr. Dixon's manager of product safety at Sikorsky. He has had over 34 years of engineering experience at Sikorsky.

He has been a designer of transmissions, rotor blades and systems.

He became chief of rotor systems and subsequently chief of design and later program engineering manager in the late 1970's. He became program engineering manager on CH-53 E. Helicopter completing its development phase and production release.

In 1980 he became chairman of the flight safety board, an organization dedicated to full time maintenance of

safety of Sikorsky products. In 1982 the new organization was founded, which contained the flight safety board safety (p. 398) system and flight safety investigation. He is its manager now.

Foremr navy pilot, a commercial pilot's license. Graduated from Rensselaer Polytechnique Institute with a degree of bachelor aeronautical engineering, advanced studies at California Institute of Technology.

The Court: You are offering him as an expert in what discipline?

Mr. Booker: In the background of the CH-53 helicopter, its negotiation with the government, and then as to the technical aspects of certain parts of the CH-53 design.

The Court: Your motion is granted. My ruling on expert testimony is in effect during this witnesses' testimony, ladies and gentlemen.

By Mr. Booker:

Q. Mr. Dixon, what is your full name and your residence address?

A. My full name is Thomas Paige, P.A.I.G.E., Dixon. D. I. X. O. N., 1087 West Broad Street in Stratford, Connecticut.

Q. Are you presently employed by Sikorsky?

A. I am.

Q. What was your first connection with what ultimately became the CH-53 series helicopters?

A. I first became involved in the proposal which was (p. 399) identified by the navy as H. H. X., which was for

heavy helicopter, in the mid 1960's. We were supplied a type specification and requested to propose a helicopter to that specification.

Q. I ask that the witness be furnished—if your honor please, we are going to use virtually all the exhibits with this witness. Perhaps Mr. Hawkins could have them all brought over?

The Court: All right.

By Mr. Booker:

Q. Would you please look at defendant's Exhibit 14?

A. I have it.

Q. Do you recognize that?

A. I do.

Q. What is that?

A. That is a type specification issued by the navy for the aircraft, Sikorsky to propose a helicopter.

Q. Did Sikorsky bid on that?

A. He did.

Q. Who else bid on it?

A. Boeing Vertol was, I believe, the only other competitor.

Q. Can you tell us who Boeing Vertol is?

A. They were originally called Vertol Aircraft. They were bought by Boeing, and I am not sure exactly what time (p. 400) frame that happened. They manufacture helicopters in the class that we produce with a twin rotor.

You have probably seen them around, but I believe that those are the only twin rotor helicopters that are produced in the United States.

Q. Did Sikorsky prepare this type specification proposal for the helicopter?

A. We did not.

Q. Did you have anything to do with the original preparation of it?

A. We did not.

Q. Once Sikorsky got that proposal from the navy, what did it do?

A. We were first off given an advance copy, same as Boeing, was to start our background design work and look at the problems with the type spec as they presented it to us. When we officially received it we were probably given about 90 days to complete a proposal and submit that to the government. And probably, as I recall, 30 days later we had to submit the financial quote for an entire weapons system. This is the first time it was ever done by the U.S. Government. Done under, I believe, Secretary McNamara.

And in it we had to propose the design, the test and the qualification of a helicopter to meet this specification.

Q. In addition to these specifications which related to this specific helicopter, were there any other navy specifications which you had to meet?

A. Oh, yes. This specification starts out with a host of specifications that we have to design this aircraft to.

Q. Would you look next at Exhibit D. X. 11 in one of the books before you, probably in volume one.

A. I have it.

Q. What is that called?

A. Just a moment, let me get this straightened out, first.

Q. What is this document?

Give us its name.

A. D. X. 11 is a general specification for designing construction of aircraft weapons systems, and this happens to be volume two, which is for rotary wing aircraft or helicopters.

Q. What is the date of this?

A. The date of this is 13 March 1959.

Q. Who put that out?

A. The Department of the navy and their bureau, which in those days was called Bureau of Aeronautics.

Q. Did Sikorsky prepare this document?

A. We did not.

Q. What is this document referred to as?

A. This is the parent or grandfather spec for all helicopters that the Navy procures. And a special version of (p. 402) this would be called the detailed spec for an aircraft.

Q. What is the nomenclature of this document, what number is it identified as?

A. This is identified as S. D. 24 L.

Q. What is the relationship between S. D. 24 H. and the Navy request for bids for an assault helicopter which you have identified as Exhibit 14?

A. That type spec refers in its early paragraphs to S. J. 24 H.

Q. What, without reading precisely what it says, what does it generally cover?

A. Both specs put together cover a specific helicopter. It explains what its mission shall be, what its weight shall be, what it shall be capable of doing from a speed standpoint, from an altitude standpoint. What specifies the flight control system is to be designed to, what specs the airframe is to be designed to, the speeds on landing speeds that it must be able to withstand, and it also explains the crew and all various equipments and the specification they are to be designed to, as well. Plus a lot more. And fundamentally also coming up with how it is to be tested.

Q. Did the specification for the assault helicopter contemplate that whoever was successful bidder at Sikorsky or Boeing would supply all of the parts for the helicopter?

A. No. It will call out the parts that we supply, and it (p. 403) will say that in particular—in this one it would say what engines were to go in the aircraft, because the engines are paid for under a separate program and developed and qualified under a separate contract not related to this helicopter at all.

Q. Would you turn to Page 7, Phase, of Exhibit 14. That is the specification for the assault helicopter. And

tell us what equipment the government expected to furnish to whoever was the successful bidder.

A. I am sorry, you said—

Q. Page 7. Are you looking at Exhibit 14?

A. Probably I am not.

Q. I believe you are looking at Exhibit 11. Exhibit 14.

A. 14, Page 7?

Q. Yes.

Q. What equipment was the government going to furnish?

A. Government furnishes power plants.

Q. What is the power plant?

A. That is the engines that go in this aircraft. This is a two-engine aircraft. It calls out the starter, that is the mechanism that would start the engine. It calls out an A. P. P., that is auxiliary plant, that is a small engine that is used to generate power to start the bigger engine, not unlike a great big diesel Caterpillar tractor, for instance, has a starting motor. It supplies essentially all of the (p. 404) instruments in the aircraft, a lot of the electronic equipment, armament and first aid kits.

Q. Was Sikorsky the successful bidder to the United States for this contract?

A. We were.

Q. Once Sikorsky got the contract, what did it have to do to prepare any plans or specifications?

A. Once we received the contract to go ahead and build this helicopter, we then assist the Navy in preparing documents that we have to go under contract for such, as the detailed spec for the aircraft itself, a test and demonstration specification, which is how we are going to fly this aircraft and demonstrate to the government that we have met our requirements, and also a test and data specification which says these are all of the ground tests we are going to do and here is the data. The paper part or the soft part of the helicopter, when we are going to produce these reports and so forth on a schedule.

Q. Did in fact Sikorsky prepare those documents?

A. We did.

Q. Did they secure the Naval approval of them?

A. The Navy, actually they are Navy documents. We prepare them and coordinate with the Navy. They have the final say what is in them, and they are then signed by them.

Q. Would you look now at Exhibit D. X. 15 and tell us (p. 405) what that is.

A. This is a demonstration specification for the CH-53 A., and in parenthesis it has H. H. X. because in the early days, very early days everybody understood the helicopter was H. H. X., Once Sikorsky got the contract it became identified as CH153 A., so we called it by both names, the Navy and ourselves, so we wouldn't make any mistake in what it really was.

Q. What did these requirements set forth?

A. These requirements set forth all of the—all the requirements that we have to meet in order to demonstrate

to the government that we truly have built an aircraft to the specification and it performs as we said it would.

Q. Who issued that document?

A. The Navy issued that document.

Q. Who approved it? Can you tell us specifically who?

A. Well, its approval on here is, and I don't remember him, J. Henedricks, Captain, U.S. Navy.

Q. Once Sikorsky got the contract, did it then cooperate with the Navy in preparation for full specifications for building the specific kind of aircraft?

A. We did.

Q. What was the first one of the aircraft in this series to be called.

A. CH-53 A.

(p. 406) Q. What was the 53 A.?

A. The 53 A. was a two engine helicopter with a single rotor that met requirements. Fundamentally the aircraft was to be an assault helicopter, had to go from a carrier to so many miles behind the beach and off load Marines and cargo and return to the carrier. It had a two-hour fuel supply, plus alternate fuel for another landing spot in case weather or something happened to the aircraft. And had to have a maximum speed of 170 knots, a cruise speed of 150 knots. Had to carry 38 troops, somewhere in the order of six or eight tons of cargo. I really have forgotten all the details, but they are spelled out and have to be demonstrated in this Exhibit 15.

Q. I now ask you to look at defendant's Exhibit 12. That may be in the other book.

A. Yes, I have that.

Q. What is defendant's Exhibit 12?

A. This is the detailed spec. As I said before, they originally went out with a type specification, and the type specification would allow any company to propose the helicopter. It didn't say it shall have two rotors or one rotor on the top. The detailed spec now gets very specific and said it shall have one rotor on the top, and has a description of what it shall be. And it is essentially is a specialized specification that complies with the S. D. 24 H.

(p. 407) Q. Who issued defendant's Exhibit 12, the detailed specs?

A. The Navy issues it finally.

Q. This version says final corrective. What does that mean?

A. Well, at the last moments there is a lot of fine tuning, little tiny corrections and what we have, what we call blue sheets. We submit what the Navy and ourselves feel is the specification for the Navy to issue. When they move it up through all the way to the Secretary of the Navy, and perhaps, I think in those days to Secretary McNamara, there are little fine tunings being done, blue pages inserted in here to up-date it, and they are done almost on a weekly basis.

Finally that is all corrected and all incorporated, and this would be the first issue that went out on this as a totally corrected issue.

Q. And would you describe in some detail the back and forth between Sikorsky and the Navy in evolving this document?

A. Well, it all starts with a type specification, and we have submitted to the Navy during our proposal stage what we consider the helicopter would be. They don't always agree with us, either. They will say, no, that is not correct, you don't meet the specification and so forth. So there is a lot of back checking and some changes and so forth like that (p. 408) until finally we then say this is it. Now, this is the basic contracting document that we have to sign with the Navy. And in that document it says S. D., in this particular case called 552-0-1 is the father document for the CH-53 A. helicopter. S. D. 24 H. is the kind of father document for all Navy helicopters. And in this it will very clearly specify the mission, the weight, the fuel it must carry, what the rotor looks like, what the flight control system will be like, and what it shall be tested to. Because in this you will find all the references to all the other documents that come down in this just immense tree of specifications, of which some we discussed today.

Q. Did Sikorsky build a demonstration model helicopter to meet these specifications?

A. We did.

Q. And was that submitted to the Navy for review?

A. It was.

. . .
. . .

(p. 409) Q. All right. At this point in the early 1960's what was your roll in the D.X.X.—matter or in the CH-53 matter?

A. I was responsible for rotor systems, and I was involved in negotiations on the specification relative to that area of the aircraft and in the contract negotiation that went on subsequent to it.

Q. And from your knowledge and experience in working—

The Court: With that answer the objection is overruled. So that you can proceed.

And here again, I doubt if this is much controverted, so let's not waste the jury's time on too much of it. Lead him through it. But no one questions the fact that Sikorsky was successful in getting this contract, and they indeed had produced helicopters under it, I guess for 15 years now, haven't you, Mr. Dixon?

A. Pardon me?

The Court: You have produced helicopters for 15 years under your contract, haven't you?

A. Under this contract, Judge?

The Court: Well, you started in '70.

A. Started earlier, started in the mid '60's.

(p. 410) The Court: Have you discontinued?

A. This aircraft isn't being produced any more.

* * *

(p. 411) A. These are the key dates, specification I discussed before was in 1962. The detailed spec came up late in that year.² First flight '64.

First delivery in '66.

And then we ended up with a 53 A. And then subsequent to that with a larger engine the CH-53 D. So here is the contract with 53 D. and present helicopter in question in this accident was A D., talking about 1968. First flight was in '69.

The first delivery was in '69. The 151, the aircraft that had this mishap down at Virginia was in July 28 of 1970.

Then we go down into the servo that we talked about here was overhauled by Sikorsky in '82.

It was overhauled or repaired by Navair in the fourth quarter of '82.

Flight control rods changed in the Marine Corps, and now we are getting into areas I don't know.

* * *

(p. 412) Q. To move things along then a little bit, did Sikorsky get a contract for the CH-53 A. helicopter.

A. We did.

Q. Do you know approximately how many of them were built?

A. It is over a hundred of those aircraft, as I recall, were built.

A. It was.

Q. Did the Navy want another version?

A. They did.

Q. Do you remember approximately when? And the contracts were signed for the first version, is that correct?

A. They were.

Q. Your Honor, I will key them in. They have all been designated as exhibits.

When it came time for another version, what was that version?

A. CH-53 D.

Q. Is that the type of aircraft involved in the accident?

A. It is.

Q. What was the major difference between the 53 D. and (p. 413) the 13 A.?

A. Main significant difference was that it had a larger engine and its gross weight or maximum weight that it can weigh with all of its cargo and fuel and people in it was raised to 42,000 pounds. Is the weight that the CH-53 D. was permitted to go to higher, gross weight, and it could do that because of higher power in the engines.

Q. Was it necessary to go through a new specification for this helicopter to take account of the changes made between it and the A.?

A. There was.

Q. How did that plan developing those specifications evolve? Was that done the same way as the original?

A. Exactly the same way as the original.

Q. I ask then if you would look at defendant's Exhibit 13 and tell us what that is.

That is in Volume 2.

A. Exhibit 13 is numbered S. D. 552 dash 1 dash 3. That is the detailed spec for the Model CH-53 D. helicopter. The fundamental difference is the dash, 552 the 52 A., and there were some small changes made in it. Numbers were added after the dash one this happens to be a dash three. This is the first spec for the CH-53 D. It is a spec for the CH-53 D. helicopter.

Q. Was that negotiated with the Navy in the same way as (p. 414) the spec for the 53 A.?

A. It was.

Q. Did the Navy approve that?

A. The Navy issued it.

Q. Who issued it, and who approved it at the Navy and when?

A. Issued by, in those days it was called Naval Air Systems Command, Bureau of Aeronautics, issued by a J. B. Schaffer, who was captain, U.S. Navy.

Q. How many of the CH-53 series helicopters have been built altogether?

A. Well, between the Navy versions, and actually they are primarily used by the Marine Corps, but there are some Navy ones, and the Air Force versions and Israeli and German program, there is over 400 aircraft that have been built.

Q. Is any one part of our Department of Defense designated as the cognizant agency for this helicopter?

A. Well, for the Navy certainly the material acquisition, as they call it, is done by the Naval Air Systems Command. So Marine Corps and Navy helicopters are procured

from Naval Air Systems Command. They are the ones that force the specs out, they are the ones that negotiate the contracts with us, and they are the ones—I hope I am right in saying—that is physically where the check is written from. But I am quite sure it is—they don't own and operate helicopters (p. 415) themselves. Once we manufacture them and deliver them they are delivered to an operating facility, to Naval Air Systems Command.

Q. Does the Naval Air Command System or some branch of the Navy regularly maintain offices and personnel at Sikorsky for the purpose of assuring compliance with these contracts?

A. They do.

Q. Describe that staff, if you will, please.

A. Present day staff at Sikorsky is over a hundred people that are part of the United States Navy. There are, I would venture a guess, less than ten in military uniform and all the rest are civilian employees, but they cover all of the aspects of what you would expect from an acquiring agency. They have engineers there, they have quality control people there, they have contracts administrations there. And those are the three biggest areas by far. And test pilots. They test all of the aircraft that are delivered to make sure that we have met our requirements and so forth. So there is a big activity at Sikorsky.

Q. Back in the days when the 53 D's were being delivered to the Navy, did a Navy test pilot check each one of them out before it was accepted by the Navy?

A. He did.

Mr. Franেকে: Objection, Your Honor. No foundation being laid that this witness is involved in the test program.

(p. 416) The Court: The objection is overruled. Proceed.

A. He did.

Q. What is the current series of the 53?

A. CH-53 E.

Q. What kind of helicopter is that?

A. That is an immense outgrowth of the original CH-53 D. It is a three-engine helicopter, considerably—

The Court: That has very marginal relevancy, Mr. Booker. I don't want you to burden this jury with things they don't need to hear. Let's go back on D. now and focus in on this specific accident.

Q. All right.

When was the last time you had any direct responsibility for the 53 series in the sense of managing or production or design?

A. I am still responsible for the safety of the aircraft.

As far as the design goes, I left the CH-53 D. program in 1976 and went out to the CH 53 E. program. In 1980 I became responsible for all our aircraft. So I have been directly involved with the CH-53 D. and all of the last five years, four and a half years.

Q. During the course of your employment when there were mishaps involving either the 53 A. or the 53 D., were

you involved in the investigation of those mishaps from Sikorsky's point of view?

(p. 417) A. I was.

Q. And can you tell us approximately how many of those mishaps over the 22 or so years this has been out you have investigated?

A. There has to be somewhere between 30 and 40, at least, accidents. They have been involved in it probably at least a dozen of them on site, or more actually at the accident site. But all except a period of mid 1960 until the end of 1979 I was essentially involved in all of them.

Q. You have heard the testimony here today of Mr. Fox. Do you know Mr. Fox?

A. I do.

Q. And you heard Mr. Fox say that he had been as familiar with these helicopters as anybody in the Navy. is that correct, as far as you know?

A. I certainly believe he is from the standpoint of the control system on the hydraulics.

* * *

(p. 418) Q. Let me restate the question.

Are you aware of any other CH-53 D. accident once the redundant link was put into these aircraft that has been allegedly caused by any failure of the hydraulic system?

A. I am not.

Q. Are you familiar with the cockpit arrangement of the CH-53 D?

A. I am. I don't want to say I am anywhere near as familiar as a current pilot would be, but I am, yes.

Q. At the time that the Navy was considering this design, what did Sikorsky do to establish the parameters of the cockpit?

A. We were obligated in our original contract to build a cockpit mock up, a full scale cockpit that could be made out of wood and some metal, locate all the instruments and all the controls, and entrance and egresses all have to be put together in a cockpit. So it starts just right back of the (p. 419) pilot's compartment and has the whole front section. That was required by contract. We had to build that, and then call the Navy in to review it.

Q. Was that done?

A. It was.

Q. Did the Navy come in and review it?

A. It did.

Q. And did that include such things as the location of the seats for the pilots?

A. It did.

Q. Did it include the instruments, the collective and the cyclic?

A. It does.

Q. And did it include the escape hatches?

A. It does.

Q. What did the Navy do when it saw what Sikorsky had?

A. Well, I am sure there were minor chits made on the thing, but it was finally accepted, and that is the configuration that was frozen on the drawings.

Q. Was the cockpit, is the cockpit design for the 53 D. the same as the design for the 53 A.?

Yes, it is.

Q. May Sikorsky do whatever it wants to do in building these aircraft, or is it required to stick to the specification of the Navy?

(p. 420) A. We can't make any changes to the aircraft, except very minor ones, unless we have approval from the government.

Q. How does one go about getting that approval?

A. With the Navy system we have to prepare a letter to the government if we wish to initiate a change, which is called Letter of Intent, and we explain to the Navy why we think this change should be made. If they feel that it is worth them looking at it further, they will give us permission to submit what was called an Engineering Change Proposal. It is a very formal document. There is a Navy specification on how it is to be presented to them. Has all the details Sikorsky is responsible for for making that change, including the cost of it. The aircraft that needs to be modified and so forth, all the serial numbers, the design in a preliminary form and so forth. That all has to be submitted to them. They then turn on the machinery in Washington to gather all the information they need to have they need to have their spares people understand the logistics of putting this change in the aircraft that are in the field. They need to understand, there has to be a pilot training or mechanics training, they need to phase that in. There may be man power required to make the change in the field. All that is gathered by

Naval Systems Command and completed on an E. C. P., which includes Sikorsky's effort plus all the ancillary efforts the Navy does. That is (p. 421) submitted to an Aircraft Configuration Change Board in the Department of the Navy, Naval Air Systems Command.

They then are the high level people that must decide whether they can agree that that change should be made. That A. C. C. B. acts on it and either denies it and turns it down or accepts it.

When it is accepted they will then turn back in the reverse manner back to us, and ultimately we end up with a contract modification that says the following shall be done, shall be incorporated on certain aircraft on the production line and may or may not be retrofitted, or in other words, put on all the aircraft that have been delivered. But it is a lengthy procedure that is very detailed.

Q. Can Sikorsky on its own go out and make any changes in the aircraft without getting that kind of approval?

A. Only extremely minor changes, only minor changes can we do. It must be done—and in the field it is extremely difficult because the Navy sticks to their regulations. We could not make a change in the field if we wanted to, period, because there must be a document that went out to the field that says the following is to be performed. And has a number on it and tells them all of where to get the parts, what to do, how to do it, and make entries in the aircraft log that has been accomplished, and so forth.

Q. We have heard testimony about the redundant load path (p. 422) or the redundant link. Is that an

example of the kind of E. C. P. that you have just talked about?

A. That is.

Q. That was approved by the Navy?

A. It was.

Q. Is this helicopter pressurized?

A. There is not a helicopter that I ever heard of that has ever been pressurized, no. There is no—fundamentally we don't fly high enough, and if we do in that case, the pilots will wear oxygen.

Q. I would ask you to look at Defendant's Exhibit 24, which I will—I believe is probably in volume three?

Q. Volume four, I am sorry.

Do you recognize that document?

A. This is the one from—it goes to P. W. Holt, do I have the right one?

Q. Yes.

A. I recognize it, yes.

Q. What is that document?

A. It is a statement that the following aircraft were accepted by military pilots on 6/25 and delivered from the plant on 7/28 and—

Q. Of what year?

A. Oh, I am sorry 1970. This is an internal document by our Chief of Quality Control at that time that says this (p. 423) aircraft, and happens to be aircraft

157151, was delivered—was accepted by the military pilots on 7/25 and delivered from our plant a month later. A lot of times these aircraft are collected until the end of a month and then the military may come in with several crews of pilots and they will fly them out together.

Q. Is this the document involving the particular aircraft which was lost in this accident?

A. It is.

Q. And what does this indicate in so far as the Navy is concerned?

A. It indicates that it was accepted by the Military, or in other words the Navy accepted the aircraft as meeting our specification in the contract in June of 1970, and in July of 1970 it was delivered to some military location.

Q. Has that aircraft ever been returned to Sikorsky?

A. It has not.

Q. As far as your records indicate?

A. It has not.

Q. What is the purpose of the servo mechanisms on the flight control system of this aircraft?

A. It is to literally fly the aircraft. You can't fly this aircraft without those servos, the main servos on. It is not humanly possible to fly without hydraulic power.

Q. Are the main servos also called the primary servos?

(p. 424) A. They are.

Q. And is there another system in addition to the main servos?

A. We have two servo systems on the primary. We have a first and second stage on the primary system, in case one should fail we have a back up system. And then we have another servo system between the pilot and the primaries that we call the automatic flight control system servo. They serve really two purposes. They are kind of like—they take a little bit of the load out of great long length of controls that go back to the primaries, but they also have the additional feature of having an electrical signal that they receive and works off an automatic flight control system and a computer that tells the aircraft what it should do without the pilot doing anything. So it picks up an electrical signal if the pilot elects to do it that way off some computers. Or it picks up the mechanical signal from the pilots—directly from the pilot and they both go in to a valve to operate the power piston which ultimately then operates the valve on the primary servos which is, or a ways back in the aircraft near the main gear box.

Q. Can you suggest in any analogy, however rough it may be, between the primary servos and something we might use in an automobile?

A. The way the helicopter flight controls are in this (p. 425) aircraft is like having power steering. And it really doesn't very much feel at all in the controls. Also the controls are—in fact the pilots preach and teach flying with finger tips. You fly the aircraft with finger tips. It is very, very, low forces. If you shut the AFCS servo off, you are now up to several pounds of force in the stick, but I am talking about something far less than ten pounds in the stick to move it. So they feel a little stiffer because they have to go farther back in the aircraft to get to the

primaries, and they also have to move some oil that was discussed earlier in the AFCS servo and moving it back and forth if they are not on.

Q. What is the force required to move this stick when the AFCS servo system is on?

A. You are down very, very low pounds, a pound and a half or something like that, essentially, or less. Has essentially no force to speak of at all. Less than you would see in an automobile.

Q. At my request have you made any measurement of the amount of force it takes to turn the turn indicator on your automobile?

A. I did.

Q. What kind of automobile did you have?

A. I have 1982 Buick Skylark, the little Buick.

Q. What force does it take to turn the turn indicator?

(p. 426) A. Takes over three pounds.

Q. And how does that compare with the force it takes to control the aircraft?

A. That is—

The Court: That is a mathematical computation it will take a pound and a half, it will be doubled. I bet the jury could have figured that out.

Q. Are the servos on this aircraft designed and manufactured to meet a Navy specification?

A. They are.

Q. Is there also an overall military specification which relates to servos?

A. There is.

Q. You have heard some testimony about that earlier today. Is that the military specification which relates to these servos?

A. I believe it was, yes.

Q. And does that apply directly to these servos?

A. That spec is referenced in the whole tier of specs, yes.

Q. Did this servo as designed meet that specification?

A. It does.

Q. Can you explain then about the break out for us on 55 pounds, what that means?

A. The break out force that was discussed earlier doesn't (p. 427) have anything to do with shear pins or a jammed valve or anything like that. That says that if the servo has a signal that wants to make it go, we'll say to the left, and the pilot wants to override it and just push it back like it would be like pushing a board upstream, it would take about 50 pounds to pull over to the side to the right or to the left. That is the force overcoming the servos at its worst point where it is saying I don't want to go the way you want to go for some reason and it want to, say, make the aircraft go to the right, the pilot would have to then put about 50 pounds, or a little over 50 pounds to the left. And that is forcing the oil—there is a thousand pounds per square inch pressure against the piston in one direction, and you are pushing the thing backwards right

against the way it wants to go. That is the worst case possible.

Q. Is this same type of servo used on other helicopters?

A. It is.

Q. Do you know whether it is used on helicopters of other military contractors?

* * *

A. It is. We have almost identical servos on other models of ours, and if you looked at Boeing Vertol's servos they would look quite similar to ours. The fundamental mechanism having a servo valve and power is upon the trim (p. 428) piston and by-pass valves are all common in many airplanes, even including, for instance, 747 or airliners that you fly in now that all use a servo system fundamentally with the same ideas, yes.

Q. What is the present Navy policy as to how long these servos may remain on an aircraft?

A. On condition. On condition.

Q. What does on condition mean?

A. It means, not to make light of it, but on condition that it is working right. In other words, you don't do any maintenance on the aircraft other than to inspect it externally unless you spot something that has gone wrong, and then you have to correct it on the aircraft, if that is possible, or you have to replace it.

Q. When the servo first came out, was there a specified interval when it had to be replaced?

A. There was.

Q. And did Sikorsky make that recommendation to the Navy?

A. We did.

Q. Did the Navy later decide to go to the on condition?

A. Yes.

Q. And if the servo was to stay on condition until it failed, what would happen if it failed in the middle of a flight?

A. Well, if we are talking about the normal failures, you (p. 429) would switch that servo off and go to the other stage of the servo or the other servo valve and fly on that, or you would shut it off completely. You can fly the aircraft with it off completely.

Q. Did your review of the records at Sikorsky indicate this particular servo had been brought back to Sikorsky at any time?

A. It had.

Q. I ask you now if you would look at the documents which have been marked as Exhibits D. X. 29.

A. I have it.

Q. Without telling us what that each page shows, what does that indicate?

A. I must admit my memory isn't that good, but I would assume S.K.Y. 363 is the servo we are talking about.

Q. Yes, let's assume that.

A. This is all the documentation that Sikorsky maintained on that servo when it was sent to us for overhaul and repair. There is a work order at the beginning of it that specifies the contract, internal, what we call manufacturing order or service order. And then it goes through the entire thing. It was to be torn down, inspected, and overhauled are the three actions. This is all the documentation that goes with that servo, and what was done and what was found. Also all the test results that we obtained, all inspections that were (p. 430) done on the servo before it was reassembled and put back together again.

Q. Once it was reassembled and put back together again, what happened to it?

A. First off, we accept it and then the Navy has to accept it. And then it is shipped into what we call G.F.E. or government furnished equipment storage area, and the government then ships it to some depot or some specific area they want it to go to to go into their supply system.

Q. Did a Navy representative inspect it while it was still at Sikorsky?

A. He did.

Yes.

Q. Where does Sikorsky do this type—where did—where was Sikorsky doing the work on this kind of servo in 1982?

A. I can tell you where several places it could have been done, because our overhaul and repair—

The Court: Does 29 show you where this particular one was done?

A. No, this was done at Sikorsky, Your Honor.

The Court: It was?

A. Yes. And I must admit without spending some time at this thing, we have a bridgeport, Connecticut plant, we have a Stratford, Connecticut plant, we also have one at the Bridgeport airport, and our overhaul and repair facility was (p. 431) at all three locations at one time or another. I would have to read it, but at one of these three locations. As this was in 1982, I believe it was at the Bridgeport airport, which happens to be located in Stratford, Connecticut.

By Mr. Booker:

Q. Under what kind of atmosphere is work done on servos at Sikorsky?

A. Well, servos are taken apart, I don't want to call it a clean room because there is a specification—

Mr. Franecke: I raise an objection with regard to foundation. Whether or not he was present while any work was done.

The Court: No, he can, if he knows in a general way what the environment was he can answer. The objection is overruled.

Mr. Franecke: There is no foundation for his many testimony. I don't know what he means. By environment, the temperature of the air, or what it is vague and ambiguous.

The Court: You will have an opportunity to cross-examine him later on. I expect you can get answers to almost all of these inquiries.

A. There is a specification for what the assembly and disassembly area of these and testing is.

A clean room is a very definite definition where you see people with caps and gowns and things on their shoes and (p. 432) all. It is not that level, but it is like a gray room, as we call it. But it is under very controlled temperature, humidity and cleanliness requirements.

Q. Why are those requirements enforced?

A. Small particles get into these things, the clearances in the servo valves, as an example, are of the order of about a hundred millionths of an inch clearance in them. They are very, very close. It takes practically nothing you have to be careful. Everything is very clean that goes into this thing. It is well filtered, and the parts are cleaned before they are reassembled. That is why it is—the controlled environment is required.

Q. Does Sikorsky use any of the so-called tenten steel at all at its plants where it re-builds servos?

A. We do not.

Q. And why is that?

A. We procure nothing but stainless steel because we use it in a lot of places, safety wiring is done all over. You can't use anything other than stainless steel with the military as a rule, because it will corrode and you will have problems with it. To prevent any possibility of mixing up ten ten or carbon steels, which rust with the safety wire steels, we don't permit it. So we procure for even routine activities that wouldn't require corrosion resistant we use the stainless steel wire.

(p. 433) Q. After all the work is done, is it tested to make certain that it functions properly?

A. It is there a is a acceptance test procedure that is specified by us that it has to meet before it is delivered.

• • •

Based upon your experience do you have an opinion whether under the conditions that you have described when (p. 434) this servo was reworked at Sikorsky in 1982 a chip of some type of metal resembling ten ten steel could have been introduced into the servo and yet have the servo still work when it was tested upon completion of its overhaul?

A. Your Honor, can I break that into two parts?

The Court: No, because it is one question. Do you have an opinion, yes or no. Now, if you say yes or no—if you say yes, he will ask what is the opinion.

A. I will say a servo, yes, it would pass.

Q. What is your opinion?

A. Whatever wire that we could possibly put into that port would be cut off, period.

Q. My question was more specific than that. Let me try it one more time, and we will go on to another question.

Do you have an opinion if whether there was anyway a piece of that type of wire could have been introduced into that servo while it was at Sikorsky for overhaul.

A. I think it is a very, very slim chance. We don't have the wire inside our shop, so I don't see how it could happen.

Q. Have you seen the escape hatch which we have offered in evidence as Exhibits 2 here?

A. I have.

Q. Do you recognize that?

A. I do.

Q. What is that?

(p. 435) A. That is the co-pilot's emergency escape hatch.

Q. Approximately how far is the emergency escape hatch from where the co-pilot sits?

A. I would have to say it is—it must be eight inches, maybe six inches away from his body.

Q. And between the co-pilot and the escape hatch is there an escape hatch lever?

A. There is.

Q. Where is it mounted?

A. Mounted below the window and at the forward portion of it.

The Court: Mr. Dixon, while we are on this subject now, what is the distance between the co-pilot's collective stick when it is in the up right and that emergency—and the handle on his emergency exit window?

A. The distance laterally is about four inches.

The Court: When it is in the up right?

A. Yes.

The Court: All right, fine. The alternate juror asked that question, so now you have an answer.

By Mr. Booker:

Q. When the collective moves up and down, does it also move from side to side?

A. No, it doesn't move side to side, but if the handle is here and the collective is here, as it goes up and down the (p. 436) distance between it would change.

Q. That is the triangulation you are talking about?

A. Yes.

Q. But the horizontal distance will always be at least four inches?

A. Right.

Q. So that while if it is up here it might be greater distance away, and while it is down here it is a greater distance away, at the closest point the collective will be four inches away from the escape hatch knob?

A. Right.

Q. And has Sikorsky made certain pictures taken of a similar aircraft demonstrating that?

A. Yes.

Q. I ask you now, if you will, please, sir, to look at Exhibits 33 and the exhibits that follow that.

I think you will find them in Volume Four.

If Your Honor please, these exhibits are in the jurors' note books.

The Court: All right. Fine.

Q. These photographs.

The Court: Unless they have better luck than The Court has, they don't have them.

A. I don't have them either.

Mr. Booker: The photographs, I am sorry.

(p. 437) The Court: No. Do you have them?

Mr. Booker: 36, I am sorry, Your Honor. I started at the wrong number.

The Court: Okay.

Q. Do you recognize those photographs?

A. I do.

Q. What does Exhibit 36 show?

A. Exhibit 36 is a photograph taken looking forward from inside the cabin at the cockpit.

There is like a step or a box that is at the bottom center of the picture, which is a storage box, and then you will notice there is about I think 15 inches perhaps vertically. There is the level of a floor there, that is the floor of the cockpit. What happens to be in the very center of the photograph continuing up is the center part of the instrument panel, and at a very shallow angle, so it is very difficult to see details, it is the lower console.

Above that there is part of the windshield and a compass in the very center, and then above that is what we call the upper center console or the overhead console. The pilot's seat sits to the right of that, and you can't see him. There is a bulkhead or a partition there that looks like a waffle. That is, the pilot sits in front of that area there.

On the left side the co-pilot is more exposed and you (p. 438) can see the back of his armored seat there.

And the personnel door that you normally enter the aircraft is on the very, very right edge of the picture. You can just see a small amount looking through that opening.

And you can see the upper part of the door is folded up against the overhead. And the lower part of the door drops down to the ground and has steps in it, so that is how you climb up into the aircraft.

Q. Yesterday Sergeant Tubbs described a crew box. Do you see the crew box in this picture?

A. The crew box is the box you see in the center at the bottom.

Q. Is that used as a step up to assist someone climbing up into the cockpit?

A. It is.

Q. Once the person is on the crew box, does he have that other step up to get into the cockpit?

A. It is a high step, but he makes it. I think 15 inches is a guess, maybe a little bit more.

Q. There appears to be a set of somekind to the right of the picture, what is that?

A. Crew Chief seat. That is the seat he sits in.

Q. Now would you look at the next photograph, Exhibit 37, and tell us what that is?

A. That is a picture taken from inside the cockpit, we (p. 439) will say up in the back of the cockpit to the

left of the co-pilot and high up so you are looking down at the pilot. What you can see in that picture that is red is the co-pilot. It is obvious, his arm, and the other red portion you can see, that is his leg.

He has his hands on the collective stick for the co-pilot.

And the left, on the left side of the picture is an arc that goes from the bottom to the top of the photograph. That is the lower side of the window frame. And the yellow portion you can see there is the emergency escape handle.

Q. Does that show the collective?

A. That does.

Q. And I observe that is his hand on the collective?

A. It is.

Q. When you said there was a four-inch distance across, what distance, looking at that photo, are you referring to?

A. That would be the distance between the yellow lever and the shiny mechanism that you can see there, which is part of the collective stick.

Q. I now ask you to look at the next photograph and tell us what that shows, 38.

A. 38 is taken from the same location, but now the collective stick is higher and—well, no, it isn't. I am sorry. It looks like—like it is the same level. You can (p. 440) see now the co-pilot has his hand on the emergency escape handle.

Q. And can you give us any idea about what position the collective is in there?

A. Collective is at least as high as that handle, so that is the minimum clearance that you would see.

Q. And if the collective were higher, would there be more?

A. If the collective was higher, his hand would be underneath and you would get even larger clearance.

Q. I ask you to look at Exhibit 39 and tell us what that shows.

A. Exhibit 39 is the left-hand side of the front of the aircraft, and the person sitting there is located in the co-pilot's seat. And if you see, you can see the outline of the window as is in the courtroom. You can see it located in that photograph.

And you are looking through the window at the co-pilot.

Q. I ask you to look at Exhibit 40 and tell us what that shows.

A. 40, he has unlocked the window and pushed out the bottom, and you can see it starting to drop down.

Q. Now, would you look at Exhibit 41 and tell us what that shows?

(p. 441) A. 41 is the window is out now. That is the opening that the co-pilot goes through.

Q. Now, the last photograph, 42, tell us what that shows.

A. That is looking from the left front, your back at the aircraft and—well, it shows the so-called chin window that has been discussed before. There is another window above it, the windshields, and it shows the opening for the—No, I am sorry. The window is installed there. The co-pilot's window is fully installed.

Q. And what is that rod or device that appears sitting right in the middle of the co-pilot's seat?

A. That is the cyclic stick that fits between his legs.

Q. And is that the stick about which we have heard some testimony as being two inches off center?

A. That is—this is not the aircraft, but that is the same stick as was discussed before.

Q. In this photograph what position is the co-pilot's stick shown?

A. It is kind of hard, but I would guess that it is aft in the center.

Q. But does that appear to be in its proper position, up right?

A. I guess so. I don't think I could really tell you very fairly whether is that up right or not.

Q. I now ask if you would look at Exhibit 23, which is a (p. 442) series of discrepancy reports on this aircraft. I think you will find them in volume four.

A. I have it.

Q. When did it come to your attention there had been an accident involving this aircraft?

A. I am quite sure it was probably the same day of the accident.

Q. Did you have the responsibility for coordinating Sikorsky's efforts toward the investigation of the accident?

A. I did.

Q. Did you dispatch any Sikorsky personnel to assist the Navy in investigating the accident?

A. Yes.

Q. Whom did you send?

A. Tom Conroy, who has been identified earlier as Conway by Terry Fox, but it is Conroy.

He is one of the accident investigators working for me. I dispatched him, I believe it is same day. And we had engineers go with him, so that they left either that same day or the next morning, I don't seem to recall when, but very shortly after we were notified.

Q. What is Mr.—What was Mr. Conroy's particular responsibility at that time?

A. He is to assist the Navy on the accident investigation. The Navy investigates the accident and, we (p. 443) are there to assist them. So we all offer them any help we can supply to them, whether it is our laboratory use or engineers, we will send other engineers down if we see it is necessary, but it is primarily to find out what the cause of the accident is.

Q. And what is Mr. Clemons' basic area of responsibility?

A. Design engineer and critical systems area.

Q. Why did you send someone with expertise in the critical area?

A. We were initially told that it was a flight control problem with the aircraft.

Q. During your supervision of the investigation of this aircraft did it ever come to your attention that Mr. Fox had identified a chip as possibly causing the accident?

A. It did.

Q. Did you ever express the opinion to Mr. Fox that that was not the case?

A. I did.

Q. And is it still your belief that that chip did not cause the accident?

A. Absolutely.

Q. And without referring to any particular things which you may have done, can you tell us generally the reason that you think it could not have happened as Mr. Fox postulated?

A. He gave us the cross section of that chip, or in other (p. 444) words, its dimensions.

Even if you assumed that probably the strongest piece of wire you could think of you could put in there, you can't get enough force for the pilot to even probably feel it in the control stick. If you run through the analysis, it is like in ounces, not even one pound of additional force it takes to break that piece of wire.

It is negligible.

Q. So if by some fashion that chip could have gotten from the place where it was found where it was causing no problem into the system, what would have happened in your judgment?

A. It would have just shared the piece of wire and eaten it up.

Q. Would that have caused any input that would have been noticeable to the pilot?

A. Not unless the pilot was super sensitive, could feel ounces in the stick. And it is only if he could feel ounces. But we are talking about guaranteed less than a pound, far less than a pound.

Q. Would it have affected the control of the aircraft in anyway?

A. It would not.

Q. During the course of your investigation did you have occasion to review the maintenance records on this specific aircraft?

(p. 445) A. We did.

Q. Do you see those before you?

A. Yes, I guess that is what each one of these is.

The Court: That is Exhibit 23 that goes through the alphabet?

Q. Yes, Your Honor.

The Court: Down to A. A.

Mr. Booker: Yes, Your Honor.

The Court: All right.

Q. I am not going to ask you to look at each one of those, but I would ask you to look at two or three of them then and tell us what they indicate to you. First of all, would you look at the one, subparagraph W.?

The Court: You say subparagraph, you mean Label W.?

Q. Yes, Your Honor, I am sorry.

A. I have that the.

Q. What does that describe?

A. Well, first let me make sure I am on the right number. 557 is at the top of it?

Q. Yes.

A. This is a vid/mafs form that was brought up before the discrepancy that was described by the pilot. At least I am pretty sure it is, because I know this man. I think it is a pilot. He grabbed it as a co-pilot cyclic stick leans left when pilot's cyclic is straight up.

(p. 446) Q. Is that consistent with the information that you have heard that the co-pilot's cyclic was two inches off center?

A. It does.

Q. Based on your experience with this aircraft, what should have been done when that was noticed?

A. It absolutely should have been referred to. It should never have been left that way.

Q. What would have been—what should the aircraft have been done in so far as flying it was concerned?

A. Should not have been flown until it was found out what caused it and corrected.

Q. Why do you say that?

A. Well the most difficult thing that would happen is if the aircraft was flown in instruments by the co-pilot, one of the references he uses is the position of his stick. He has to fly the aircraft with a stick off center all the time in order to be able to keep his wings level, or as we call it, wings level, and certainly it is taxing to that individual. Plus the fact that if you made a full left correction with that stick it is bound to hit his leg. The control motions that are on a cyclic left and right are shorter than other dimensions, primarily because of your body configuration and so forth. So you obviously if you are moving it two inches further over when it is full left it will be hitting his left leg.

(p. 447) Q. If it hits his left leg, what does that do to his ability to make a full left?

A. Certainly very disconcerting to say the least, but I suppose he could somehow work his way out of it and get his leg out there and push against his leg. But the control motions that are in that cockpit right now bring the sticks right over just about to your legs if you sit properly. You can't sit with both of your knees going forward, obviously.

So you get used to flying with your legs spread. This just means that the normal position of a pilot would assume that stick would hit his leg.

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(p. 449) Q. Now, would you look at the VID/MAF's marked Z. What does that say?

A. That says, number two auxiliary gauge, no function.

Q. What does that indicate to you about the aircraft?

A. Well, from what I understand, it is probably in the fuel tank itself. These tanks are supplied by the government and they have had a lot of trouble with the fuel not reading anything at all, so you can't read the fuel. What it does mean is the pilot in the cockpit cannot tell how much fuel is in that tank.

Q. Is that of any interest to the pilot?

A. It certainly is, unless you are very clairvoyant or something. There is no other way that I can visualize how you would know how much fuel is in the tank.

Q. Is that a situation that should have been corrected before the aircraft was to fly, in your opinion?

A. I have to answer that two answers.

One is no. But he could take off as long as he was going to fly, we will say, less than two hours, he doesn't (p. 450) have to worry about that fuel in that tank. He has enough fuel in his sponsons, and the sponson tanks are what you use to fly the aircraft.

When they are dry, you are going to come down unless you can supply fuel from the aux tanks. So he could take off and fly with assurance that he would have no problems at all for at least two hours. But if he went on an extended flight where he wasn't transferring then he has a problem, because he has no idea unless the tank is fully topped off in the beginning how much fuel he has to start with, and then he doesn't know whether he is transferring fuel or not, either.

Q. In the event that he had filled all tanks, would there be anyway he could tell what the fuel level was in that tank?

A. No.

* * *

(p. 451) Q. From your review of all of the maintenance records on this aircraft, did you reach any conclusion about the general view about the general state of maintenance of the aircraft?

A. Well, I think the control stick is most important thing of all. I think that should have been a downing crab, and the aircraft should not have been flown until corrected. I think it is too serious an area, for sure, to fly.

Mr. Franecke: I object and move to strike the answer as non responsive, and also because there was a question of whether he had an opinion, and he began to state the opinion.

The Court: Well, here again, his answer is not exactly responsive, Mr. Booker. Get him to give you a responsive answer.

Q. I will restate the question.

Based upon your review of all of these discrepancies (p. 452) noted on the aircraft—

The Court: Now, that is from A. to double A. A.

Q. All those which you reviewed at the time you were investigating this accident, did you reach any opinion concerning the general maintenance of this aircraft by the squadron?

A. Yes.

Q. What is that opinion?

* * *

A. I may maintain it is loose, is very, very loose.

* * *

(p. 456) Q. Is there anything in the maintenance that would cause the aircraft to have gone off into this turn into the water?

A. I can't answer that. I don't know.

Q. Then why, sir, was it of interest to you as an expert from Sikorsky to testify to this jury that there was shoddy maintenance?

A. It certainly is. I don't think I was trying to hedge on it at all. There is very poor maintenance on this aircraft. That was the question I was asked.

Q. May I ask you what that has to do with the aircraft turning right and crashing into the ocean?

A. I am sorry. I guess I am supposed to answer the questions I am asked, and I answered that question.

Q. As it was posed to you by Mr. Booker, Sikorsky's lawyer?

A. Right.

Q. All right.

I presume, sir, that my question also with regard to the two inch offset on the stick would basically result in the same answer in as much as the pilot and Sargeant Tubbs testified that they had flown the aircraft for three and a half hours that morning without any problem.

A. I can't agree with you on the two inch. I think that (p. 457) is a serious problem. That could be a serious problem interfering with somebody's leg.

Q. If it did interfere with somebody's leg while actually flying the aircraft, would you anticipate that in a three hour flight of constant maneuvers up in the air that that would become evidence to Captain Tussing or even Lieutenant Boyle?

A. Oh, I think it was. In fact, it was identified in earlier flights even.

Q. It was evident, wasn't it?

A. Yes.

Q. But was it evident that it actually contributed in anyway to cause the aircraft or cause the pilot's any difficulty in flying the aircraft?

A. Oh, I don't—I can't answer you.

Q. Well, did you hear Captain Tussing testify that it didn't cause any problem with regard to flying the aircraft for three and a half hours, and also one hour in the second flight?

A. You probably are right. But I can't answer you.

Q. All right.

I note, sir, that the photographs that you had indicated had been taken, Exhibits 37 through 42. Were you present while these photographs were being taken?

A. I was not.

(p. 458) Q. You were not.

So you are only testifying as to what you see before you, is that correct?

A. That is correct.

Q. And do you know, sir, what the position of the collective was with relationship to its travel as you pointed out up and down in photographs marked Exhibit 37 and 38?

A. I would say they are both about level with the handle.

Q. Would that be at its full travel up, or would it be in a down position?

A. Well, it is not down.

Q. Somewhat up?

A. It is, oh, yes, definitely up.

Q. About one third up?

A. I don't think I would want to venture a guess. I would think probably at its closest point to the emergency handle, and that is why they took it. I know it does go higher.

Q. It does go higher, does it not?

A. Yes.

Q. You have seen plaintiff's exhibit showing the handle and in its full up right position?

A. Yes.

Q. This photograph does not depict that, does it?

A. No, it does not.

Q. I note in Exhibit 38 that that little red button, the (p. 459) lower left-hand portion of the collective there seems

to be what might be a sharp edge on the edge of the collective, do you see that?

A. I will have to look at—the other picture probably is better without the handle in it. Yes, go ahead.

Q. Have you ever scratched the top portion of your left hand or your wrist trying to reach for an emergency handle in a crash landing in the water?

A. I have never done it.

Q. You never scratched it or you never—

A. Never experienced it.

Q. Okay. You never crashed in the water?

A. That is right.

A. I haven't in a helicopter. I have in an airplane.

Q. Okay.

Did you ever scratch your wrist or your hand?

A. There was no collective stick in an airplane.

Q. All right. I am sorry.

Okay. Well let's say in a helicopter, have you ever scratched your wrist and hand?

A. Not in that—no, I haven't.

Q. Have you ever tried to reach for the emergency handle while the collective is full up?

A. I have.

Q. And did you come in close proximity to the top of your (p. 460) left hand and wrist?

A. Actually your hand is almost underneath it at that point when it is up that high.

Q. If you are reaching under it?

A. Well, that is the normal way you would reach for it. It is high enough up so it is more or less out of the plane of your hand.

* * *

Q. Mr. Dixon, going to the maintenance records, which I believe have been marked as Exhibit 29, that was the servo repair records?

A. Yes, I have those.

Q. Sir, were you at any time either a shop supervisor or inspection supervisor with regard to the various types and methods of repair work that were done on these type of servos?

A. No, I was not.

Q. Where you present while this particular servo was in fact (p. 461) worked on in the first quarter of 1982?

A. I was not.

Q. Did you review any test procedures utilized even by the maintenance people at Sikorsky for work on these types of servos in and around the first quarter of 1982?

A. I have seen this procedure done, yes, but not on this servo. And it was before this accident even.

Q. Okay.

This exhibit in fact contains information that would indicate to you that this is a contract with the Navy, is it not, for the complete repair of the servos?

A. It is.

Q. And the Navy had asked that the servo be completely torn apart, cleaned and resembled, isn't that correct?

A. I really think, because I am familiar with the contracts but not this specific one, these are normally given as a blanket to cover servos coming in for repair or overhaul, and it will be determined by what is wrong with them, when they are sent in, whether it is overhaul or just a repair.

So to say that the Navy specifically stated this one should be overruled, I don't think I can tell you that.

Q. However, in this particular case, and in your review of these documents, does it not indicate that all of the servo was completely torn apart or taken apart for rework and (p. 462) repair?

A. When you say all of the servo by Sikorsky, no, we don't touch the Moog valve, we don't do that ourselves at all.

Q. We will get to that.

The Moog valve in fact was removed, was it not?

A. Yes.

Q. And the Moog valve was a part of the contract to be either repaired or reworked by Sikorsky from the Navy, was it not?

A. Yes.

Q. So it was Sikorsky's responsibility to make sure that the Moog valve was properly repaired?

A. Certainly.

Q. It was.

In fact, isn't it true, sir, when the servo, the one that was on the crashed aircraft, was in fact reassembled there were two Moog valves attached by Sikorsky, were there not?

A. I am sure we can find the paper work, but yes, had to be. Otherwise you couldn't check the servo out.

Q. Okay. This Moog valve I think you indicated was not touched by Sikorsky?

A. We don't open those at all. We don't—we don't have the facilities for doing that.

(p. 463) Q. What do you do with them?

A. We send it to Moog.

Q. They come back from them?

A. Yes.

Q. Then you put them back on top of the servo?

A. Correct.

The Court: What does Moog stand for?

A. That is the name of the man, that is his name. It is, Your Honor, unusual, but that is his name.

A. M.O.O.G.

Q. It is also true, is it not, in your review of these documents that the particular fix for the binding, ratcheting and sticking problem that was associated with these roll servos was not incorporated in your repair work in the first quarter of 1982, is it not?

A. You are talking about the proposed fix for the changing of the seals?

Q. Yes.

A. No, it wasn't approved by the government.

Q. It was not approved by the government at that time?

A. I am pretty sure it was not.

Q. The answer is, yes, if I understand you correctly. There was no fix incorporated at this time?

A. That is correct.

Q. And that was the O-ring and other things having to do (p. 464) with the binding and ratcheting?

A. Let me put it this way. At this time when servos came back to us for ratcheting problems they were replaced, the seals were replaced, but I think when you say fixed you are talking about a redesign at Sikorsky proposed to the government, and I would say off hand it was definitely not put in at this time.

Q. There were actually several different types of fixes that were being utilized in and around 1980, '81, '82, were there not?

A. At least one that I know of, yes.

Q. Isn't it also true toward the middle of 1982 the Sikorsky fix, if you will, was then being incorporated into the servos down at Pensacola?

A. I am not sure about that. I don't believe that is true.

Q. Do you have any information to indicate that the servo that was involved in this, in this particular crash was not merely fixed, so to speak, at Pensacola in the fourth quarter of 1982?

A. Unless I am misstating what I heard, Pensacola was not polishing surfaces, kind of machining down slightly the outside of seals that were being put in, but they were essentially the same seal, the same seal part number that was in there previous to when it arrived at O. and R. That is (p. 465) not the Sikorsky fix. The Sikorsky fix, if I am right in recalling what was said and what I can recall from Sikorsky was that we proposed a seal design change that hadn't been approved.

Q. With regard to the your indication that ten ten steel is not utilized in the shop, did you make a survey back in the first quarter of 1982 to find out whether or not there is any ten ten steel being utilized there?

A. No, I did not.

Q. Without checking there, sir, did you find out whether or not any ten ten steel is used in the first quarter of 1982 over at Moog?

A. I did not.

Q. So as you sit here today, sir, isn't it true that you don't actually know whether ten ten steel is or is not—correction, was or was not used at Sikorsky in the first quarter of 1982 in the servo shop?

A. I do know.

Q. How do you know?

A. By going by the purchase order. We never bought any. We haven't bought any at Sikorsky period.

Q. I see. You looked at some documents?

A. Oh, yes, we searched all of our purchase orders. But not in the first quarter of '82. We did it recently since the accident.

(p. 466) Q. Did you check back on purchase orders back in—

A. Oh, yes '81-'82.

A. Policy is not to buy that material. We buy stainless steel wire. We have it all over the place.

Q. Sir, Mr. Booker asked you if the Navy inspected this servo, and I believe you answered yes, they did is that correct?

A. They have to approve all of the shipments out of Sikorsky, yes.

Q. What did the Navy man do to inspect the servo?

A. To overhaul a servo we have to come up with an acceptance test procedure. That acceptance test procedure is approved by the Navy.

We then, when we after we overhaul a servo they will come in and do spot checks in our shop. But they don't inspect, they monitor our quality level. They will when we overhaul a servo, they will reissue the acceptance test procedure, accept the test data we get from the procedure to verify it met the spec. If it does, it is stamped out and then sent to the government furnished equipment crib where it is stored until the government determines where it is going to be shipped.

Q. Then do I understand your testimony, you say that the Navy doesn't actually inspect the individual servo, does it?

A. I am not sure exactly what your definition of—they (p. 467) don't look at every detailed part and monitor every step of it being put together. They do monitor our procedures to see that we all adhere to procedures, and that we have got the right environment and so forth. But they do look at every acceptance test data sheet, because that is the basis for them accepting the servo.

Q. So when you testified in response to Mr. Booker's answer that the Navy inspected the servo, you did not mean to imply that they actually had looked at this one individual servo before it left Sikorsky?

A. I don't—I am not trying to play games at all. They physically looked at the paper work for this servo, yes, with the servo and said, yes, it has passed the procedure, it is our procedure that we have agreed to, and it is stamped out. Now, if you say did they look at—did they check the torque on a certain nut, I am positive they did not.

Q. Sir, you had indicated in response to Mr. Booker's question that in your opinion that the ship that we have been talking about could not have possibly jammed the Moog valve giving the pilot a hard over stick, is that correct?

A. Yes, I did.

Q. Sir, do you have any explanation as to why Captain Tussing felt a hard over stick force resulting in the aircraft making the fatal dive?

A. I can tell you now that if Captain Tussing felt a hard (p. 468) over of the aircraft it would have been over on its back, or far beyond it, before it ever hit the water. It is an extremely, extremely violent maneuver. A hard over, a full control system hard over, not the hard over that is normally talked about, which is an electronic, that is only ten percent, and it is minor. We do this all the time to demonstrate controllability of the aircraft. But a full control system hard over is unbelievably violent. The aircraft would easily have been over on its back you can see that from the television.

Q. Why didn't Captain Tussing right the aircraft?

A. I can't answer you. I don't know.

In fact, I don't understand his thoughts, that being the stick drove all the way over to the right, either. It makes no sense to me at all.

Q. Sir, you weren't in the aircraft at the time, were you?

A. Oh, no. I am not—I am trying to say I can't understand, that is all.

Q. Wouldn't it be true that the best evidence of what actually took place in that aircraft would have been the Marine Captain who was here yesterday testifying as to what actually took place?

A. I am not denying the man's story. I wasn't there. He certainly went through a lot of trauma on that. The point (p. 469) is, though, that hard over in a flight control system is unbelievably violent.

Q. I don't think I have anything further.

JOINT APPENDIX

VOL. I I

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No. 86-492

Supreme Court, U.S.
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In The
Supreme Court of the United States
October Term, 1986

— 0 —
DELBERT BOYLE, personal representative of the
Heirs and Estate of David A. Boyle, deceased,
Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,
Respondent.

— 0 —
On Writ of Certiorari to the United States
Court of Appeals for the Fourth Circuit

— 0 —
JOINT APPENDIX
Volume II—Pages 341 to 584

— 0 —
LOUIS S. FRANECKE, Esq.
JOHN O. MACK, Esq.
MACK, HAZLEWOOD,
FRANECKE & TINNEY
221 Pine Street, Suite 600
San Francisco, CA 94104
415/391-1560

MICHAEL MOORE, Esq.
CARTWRIGHT, SUCHERMAN
& SLOBODIN, Inc.
101 California Street,
26th Floor
San Francisco, CA 94111
415/433-0440

Counsel for Petitioner

LEWIS T. BOOKER, Esq.
LONNIE D. NUNLEY, III, Esq.
HUNTON & WILLIAMS
707 East Main Street
P.O. Box 1535
Richmond, VA 23212
804/788-8200

Counsel for Respondent

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The Court: Fine.

May Mr. Dixon return to his seat.

Mr. Booker: Yes. Since he is designated, I would like him to remain.

Mr. Moore: There is a question.

The Court: Yes.

A Juror: Your Honor, I would like to know what methods of cleaning the parts is there? Is it cleaning with ultrasonic waves or wire brushes, or how are the parts cleaned?

The Court: Can you answer that, Mr. Dixon?

A. Yes. One of the cleaning methods is by pressure, forcing pressure fluid, cleaning fluid through it and ultrasonically cleaning them at the same time, yes.

The Court: Fine. Thank you. You may return to your seat, Mr. Dixon. Of course, you may remain in the courtroom.

Call your next witness.

Mr. Booker: Mr. MacLennan.

(Witness down.)

* * *

Roderick MacLennan testified as follows:

DIRECT EXAMINATION

(p. 470) Mr. Booker: If Your Honor please, Mr. MacLennan has been designated as an expert witness on behalf of Sikorsky.

He will testify about the details of the servo system. I should like to summarize his qualification for the jury and then amplify upon them slightly.

The Court: Proceed.

Ladies and gentlemen, I am permitting counsel to do this, but you will have their resumes in evidence in case you should want to look at their qualifications in more detail.

Mr. Booker: Mr. MacLennan is the Engineering Manager for the V. H. 60 Helicopter at Sikorsky at this time.

He is a graduate of Columbia College and of Columbia University with a degree in Mechanical Engineering. Has two degrees from Yale University, one of Master of Science in Engineering Mechanics and one a Master of Science in Electrical Mechanical Controls. He has been employed by Sikorsky in a variety of positions up to his present position as Engineering Manager. His work has primarily been in the flight control design area.

He holds a patent and has several patents pending on servos and servos actuators.

Mr. MacLennan, state your name and your residence address.

A. Roderick MacLennan, 175 Russel Road, Stratford, Connecticut.

(p. 471) Q. Are you now employed by Sikorsky?

A. Yes.

Q. What is the V. H. 60 helicopter?

A. It is a derivate of the 860 Blackhawk intended for presidential executive mission.

Q. How long have you been employed by Sikorsky?

A. Just over 27 years.

Q. Has most of your work been in the flight control, and specifically the servo systems area?

A. Yes, sir.

Q. Approximately how much of your 27 years has been involved in that?

A. At least 18 years.

Q. Are you familiar then with servos as standard equipment on military aircraft?

A. Yes, sir.

Q. Is the type of servo which is at issue here a standard type of servo in use generally?

A. Yes, it is quite a mature unit that is used on many different models.

Q. What experience have you yourself had with this particular kind of servo?

A. Well, it was designed prior to my getting involved with controls at Sikorsky, but I have been working with it and familiar with it I would say over at least 19 or 20 (p. 472) years.

Q. Can you describe what tools are available to the pilot of a CH-53 D. aircraft to control the aircraft in normal flight?

A. What tools?

Q. By that I mean what controls does he have available to him?

A. Primarily his cyclic stick for longitudinal and lateral control. His collective stick for altitude control and his yaw pedals for directional control, primarily in Hoover.

Q. What assistance does the servo system give him?

A. Well, we have two kinds of servos on this aircraft. We have primary servos, which are dual redundant units that provide the muscle to take the high flight loads which could be on the order of five or ten thousand pounds, out of the system and react those loads in the primary servos.

Those servos are located near the main rotor head to control the main rotor swash plate. There is three double units.

And one back in the tail to control the tail rotor blades. And there is one double unit back there. In addition, there is four AFCS servos located on the top deck that provides improved feel to the pilot. They also provide the trim function, and they give us a means to introduce the (p. 473) auto pilot inputs into the system.

Q. What do you mean by the auto pilot inputs?

A. These would be the things that allow the pilot to fly hands off. And there is two kinds of auto pilot inputs. There are electrical inputs that feed into this Moog valve that we have heard talked about today. Those inputs are limited to ten percent, but they are high frequency inputs as rapid as three cycles per second.

In addition there is some hundred percent authority inputs fed in at a slow rate, a slow rate of ten percent per second into the trim piston using the valve that is shown, that was shown in the middle of that diagram that we didn't refer to today.

Q. Is this what is called a redundant flight control system?

A. Yes.

Q. What does that mean?

A. The primary level of redundancy is to have two of each of the primary flight control servos at the main and tail rotor head. One of which is sufficient to fly the aircraft.

Additional redundancy is provided in the auto pilot servo in the roll channel that we have been addressing today by having two independent roll servos, either of which can do the job, but neither of which is essential to safe flight. You can turn them both off and still fly home.

(p. 474) Q. How does one turn off the AFCS system?

A. There are push button controls on the panel on the console in front of the pilots.

Q. If Your Honor please, I would like for the witness to make a demonstration with the same chart which was used by Dr. Packman. I wonder if we could set it up over here and move that over closer to the jury?

The Court: Marshal, move it over.

Q. Do you recognize the exhibit or the document before you?

A. Yes, it is a load channel of the 53 E. AFCS servo.

Q. Is that the same type of servo as was involved in this accident?

A. Yes, sir.

Q. Can you show us where the power piston is?

A. This is the power piston here.

Q. Are you familiar with the problem which has been referred to here as the ratcheting problem?

A. Yes, sir.

Q. In order to make a correction of the ratcheting problem would it be necessary to remove the power piston?

A. Yes, it would. I would have to say this. Two subsets of the ratcheting problem involve the power piston and the trim piston, and to correct the ratcheting problem you would have to remove the power piston and the trim piston.

(p. 475) Q. And then if you removed them, what type of opening would that leave in the servo?

A. Basically you would have to take these linkages off and open up spanner nuts here and here and pull the piston out of the servo, remove the seals that are located on the heads of the pistons here and here, and to remove the rod seals which are in the housing glands here, here, here and here.

Q. Assume that either while those pistons were out or upon replacing them some contaminant was on the piston of the size of the chip which you have heard described in this case. Could that chip work its way from that area up into the Moog valve?

A. Yes, it could by two mechanisms.

Q. Would you take—well, describe it first and then if you would, please draw how that could happen.

A. Sure. When the piston is out, the cylinder is opened to the air, a chip could get into the cylinder and not be observed. Two, a chip could contaminate the piston. The piston is usually put in wet, so the seals are wet.

Q. What do you mean by wet?

A. Wet with hydraulic oil. So they are lubricated when they put the piston back in to lubricate the seals so they are not cut.

And there are two direct paths, C. one and two, which (p. 476) communicate from the ends of the hydraulic cylinder, piston cylinder directly to the areas on the Moog spool valve where the chip was found.

Q. Is there any other way it could get in?

A. Well, when the trim piston is open, a chip could be introduced there, but it is less likely to communicate as closely to this spool. The power piston when removed has these two relatively short flow pads approximately three sixteenths inch diameter that communicate right up to that area.

Q. Based upon Mr. Fox's testimony that the power piston and the trim piston would have been removed when this servo was returned to the Navy in late 1982, would that permit the access to the Moog valve of a contaminant as you have just described?

A. Yes, it could.

Q. Through the same path that you have just drawn?

A. Yes, sir.

(p. 477) Q. Now, can you show the jury on this where the power piston is?

A. Yes this is the power piston right here. It goes through the servo, and you take it out from the end after, of course, revolving the linkages.

Q. And does that move back and forth?

A. Yes, it does.

Q. Where is the trim piston?

A. The trim piston is down on this center line here.

The Court: Down where?

A. Down right through here. That is the trim piston, and that is the power piston.

Q. When that power you already illustrated it here, but illustrate on this, when this power piston is removed, what void or vacuum or void is left on it?

A. You have got this diameter hole open essentially on this end, and this diameter hole open on that end. We are addressing stage one. So the probability would be coming in through this opening and moving up to this level, which is this level on the spool valve.

Q. So these indeed are the two Moog valves?

A. Yes, sir.

(p. 478) Q. And would the same—you show another Moog valve over here, would the same coarse take a contaminant up into that Moog valve had there been one in the system?

A. It could enter here and climb up through the same passages.

Q. That concludes what we need to show here.

The Court: All right.

Q. How sensitive is this Moog valve?

A. Well, it is sensitive in that a small force at the Moog valve creates a large force in displacement at the power piston. But it is a military qualified unit that has passed an inspection and test in accordance with mill standard 8 ten B. which includes shock test, vibration test. The equivalent of dropping it three feet onto an oak floor, perhaps.

Q. How long has the Moog valve, to your knowledge, been in standard use in servo control systems?

A. I am aware of its use since approximately the mid '50's.

Q. When an aircraft using this type of servo is in operation how often or how frequently does the Moog valve oscillate?

A. The Moog valve is driven by the internal lube oil auto pilot electronics at frequencies up to and including three cycles per second, so in an hourly basis it could see as many (p. 479) as ten thousand cycle per hour.

Q. And I might ask you now to look at defendant's Exhibit 3. Your Honor perhaps we better take that over to the jury, too.

The Court: What is that?

Q. This is the Moog valve.

The Court: All right. Or a portion of it.

The Court: Come on over closer.

Q. What does defendant's Exhibit 3 show us?

A. Okay.

This is a dual input servo valve manufactured by Moog in East New York, a supplier to us, and to the Navy of this unit.

Q. Can you pull that sleeve out?

A. It looks like it is fixed. It is fixed in position.

Q. Then let's look at this.

See whether you can tell us what this is.

A. Okay. This is the spool valve consisting of the inner spool and cutter sleeve and are located in this area.

The Court: What do you call the sleeve?

A. This member here is the sleeve. And the part that I am sliding internally to it is a spool. That is the end of the spool, and that is the other end of the spool. These are the metering ports here which meter the oil flow to either side of the power piston.

(p. 480) Q. How large are those metering ports?

A. These large holes we see are not metering ports they are just open flow holes. The actual ports are here, measure point 018 or 18 thousandths of an inch.

Q. Would that be large enough to permit the entry of a chip that was between two and five thousands of an inch?

A. Yes it would permit anything up to say 018 diameter.

Q. The testimony is that the chip in this case was found on a land. Can you point out to the jury where a land is?

A. Not without taking this apart. Lands are internal to the valve. They look somewhat like this high point, but they don't have rubber seals on them, they are bare metal.

Q. And with the chip in the land, would it do anything to the system?

A. If it was just sitting in the land, no, it would not. This is the motion we need to maintain control, the motion I am doing now. And it wouldn't do anything, it would have to actually get in the port and be half in and half out so that as the metering land went across the port it would be blocked as my thumb is blocking my hand.

Q. And what is the clearance within that internal to that?

A. Okay. The nominal clearance on the drawing is hundred millionths of an inch, or approximately a ten thousandth.

Q. What do you mean by nominal clearance?

(p. 481) A. These are lapped selectively to fit, and when they produce the right amount of drag they stop. And most valves would be probably a little tighter than that, but the average would be about one ten thousandth of an inch.

Q. And would anything larger than one ten thousandth of an inch be able to fit in there?

A. No, sir.

Q. Why not?

A. There would be no room for it.

I am looking to see if I can find a metering port here. There, I snapped your wire off for you.

Q: Now, what are you going to be able to show us?

A. I severed your wire. That is ten ten wire, I believe. All the twistems on bread and jelly beans is ten ten wire.

Q. Demonstrate what you mean by shearing the wire.

A. Okay. We put the wire in the hole. Hold my glasses. And we push on the valve, and it shears it like it was butter.

Q. Cuts it right like that?

A. Yes.

A Juror: Where is the little piece of wire?

A. Probably down in there as a piece of foreign object.

A. There you are.

A Juror: Your Honor, does this rotate your servo valve?

(p. 482) A. This servo valve has two inputs. You put electrical input here, and there is a flapper nozzle stage here that drives the end of the spool back and forth hydraulically, puts a little pressure on each end. Alternately the pilot moves his stick and he puts this input mechanically which moves the spool valve directly. The pilot's input comes in mechanically and the auto pilot comes in through the connector.

The Court: Does that answer?

A Juror: How much pressure, hydraulic pressure is on that valve?

A. This valves operates at one thousandth pounds per square inch on the pressure side.

The Court: Okay.

By Mr. Booker:

Q. Do you have an opinion based upon your knowledge of this system whether if a chip of somekind had been in the that servo from the first quarter of 1982 whether it would dislodge during flight operation?

A. Well, the chip was very thin. It was half a thousandth of an inch thick. And therefore I think it would be swept along by the flow in the system. And in this area of the system the flow was turbulent it scrubs the walls of the passages as it goes around corners and negotiates the passages. It is well screened, and I think it would be (p. 483) picked up and either swept into the valve where it would either be cut up or it would be swept through the valve out through the return line and captured in the return filter. I think that would occur early on in the event.

Q. And when you say early on, how soon?

A. Well, I think that would be a statistical thing. Chances are it would happen in the first five minutes rather than the first hour, the first hour rather than the first ten hours.

Q. And if this servo had been returned in the first quarter of 1982 and a chip were not found in it, and no problem with it until April of 1983 do you have any opinion whether that chip could have been, in your opinion,

could that chip have been in there from the time it left Sikorsky in 1982?

A. Highly improbable.

Q. Why do you say that?

A. Because of the thinness of the chip, the scrubbing action of the high velocity fluid and the likelihood that the chip would be swept out early in the servo service.

Q. Had the chip been on the land where it was found, how many times would it move back and forth in the course of a minute during normal flight operation?

A. It moves at frequencies up to and including three cycles per second, so that in a minute it would have (p. 484) something like two hundred cycles, 180 cycles, somewhere along in there.

Q. If the power piston had been removed and the trim piston removed in the last quarter of 1982, do you have any opinion whether it is less likely or more likely that a chip introduced at that time might have been the chip four in the Moog valve?

A. I think the likelihood is that the chip was in there a shorter period of time.

Q. Based upon your study of this, in your opinion did a chip cause any of the phenomena described by Captain Tussing in his testimony?

A. No, sir, absolutely not.

Q. Why do you say that?

A. Well, several reasons. One, and I am going to use an analogy, if I may. I talked to the original de-

signer of this servo, his name is George Crudash, who is still with us as a consultant. The approach he used to this valve design we called the tree pruner approach, which means if you were to design a quality tree pruner you would design it to take the biggest branch that would fall within its jaws and sever that branch without any problem.

And that is how George designed this servo.

The openings in the servo valve are 0.18, and he designed it to take a solid piece of 018 wire and shear it (p. 484) like a wire cutter. And this chip is approximately one 20th the size of the wire that we know this valve can shear with minimal force.

Q. What do you mean by minimal force?

A. Well, I have done a calculation based upon the assumed shear strength of this Q. Q. W. wire based upon its known dimensions it was measured it was microphotographed, and based upon an assumed shear strength of a hundred thousandth pounds per square inch I come up with a chip shear force of two thirds of a pound at the valve. Transferring this two thirds of a pound to the stick because of the linkage ratio and mechanical advantage afforded the pilot in his large motion versus the small motion of the valve, I have to divide that number by 44. So I haven't done the arithmetic but the answer if you take two thirds of a pound and divide it by 44, that is the force you would see at the stick.

Q. Do you attach any significance to the fact that when the servo has tested at Norfolk after the aircraft was recovered it functioned normally?

A. Yes.

Q. What does that indicate to you?

A. I believe that following an accident and during the investigative process, what you find when you try to operate the various sub systems in the bench at the lab is very pertinent, and in this case all channels of the AFCS servo, (p. 486) with the exception of that longitudinal trim Mr. Clemons referred to in his deposition, work as advertised.

Q. And the longitudinal trim related to a different kind of servo or servi that performed a different function, did it not?

A. Yes, sir.

Q. And what significance do you attach to the facts when the servo was tested under power on the bench conditions at Pensacola it functioned properly?

A. To me that means it was never jammed.

Q. What other explanation can there be for the way the stick is alleged to have performed?

A. I don't understand that, sir.

Q. Do you attach any significance to the fact that the shear pin was not sheared?

A. Yes.

Q. What significance do you attach to that?

A. Analytically there is a spread between the strength of the weakest shear pin on one hand and the strongest shear pin on the other hand.

And working analytically we can predict the weakest shear pin will break with about 13 pounds on the stick and the strongest shear pin with about 25.

And this was demonstrated as correct when Terry Fox sheared the pin in the servo from the accident aircraft and (p. 487) found that it sheared at the proper value.

To me the shear pin is like a fuse in an electrical system. If you have a short you blow the fuse. If the fuse didn't blow, you didn't have a short.

And I am sure under these conditions the pilots pushed on that stick up with more than 25 pounds, but the pin did not shear in the aircraft, but it did shear in the lab test of the servo later on. If the pin didn't shear, there is no way the valve could have been jammed. Had the valve been jammed, the pin would have been sheared.

Q. Are there shear pins on each of the valves?

A. Yes, sir.

Q. Suppose that one valve had been clogged in some way, would that have kept the shear pins from failing?

A. The only way a shear pin can shear is if it sees the shear load. The only way that load can be produced is if it is reacted through a jammed valve.

Q. And so without a jam you would have no shear?

A. That is correct.

Q. Can you fly this aircraft without any hydraulic power on it?

A. No, you can't. You must have power to the main rotor or primary servos to fly the aircraft?

At least one stage must be operational to take the loads.

(p. 488) Q. Is there something called the shear force that you use to determine the amount of force that is necessary to shear the shear pin?

A. Yes.

Q. What is that shear force?

A. Can I refer to my notes?

Q. If you will, please.

A. Measured at the shear pin the weakest shear pin fails at 600 pounds and the strongest shear pin fails at 11 hundred pounds. And reflecting those numbers through the linkages to the stick the weakest one fails at 13 and a half pounds at the stick and the strongest shear pin at 25 pounds at the stick.

Q. So do you have any opinion as to how much force at the stick was being applied in light of the fact neither of those pins failed?

A. I can't really measure the force at the stick. I can assume that the pilots were pushing very hard on the stick. The problem is, I don't know where that load was going. It was not going into the valve or the pin would have sheared. It was not going into the debris in the valve or the debris would have been cut in two.

Q. Then what forces would have kept them from being able to bring the aircraft under control?

A. I can't answer that.

(p. 489) Q. Did the system as far as you could tell on aircraft function exactly as it was designed to for a servo system?

A. Yes, sir.

Q. And when reference has been made to break out forces of 45 to 55 pounds, what does that refer to?

A. That refers to the force that would be hypothetically produced if the valve was jammed open, if the power piston had gone full stroke. That would be the force necessary for the pilot in the cockpit pushing on the stick to over ride the hard over servo and drive it back to the position he wanted to put it in.

Q. Did that condition obtain aboard this aircraft from the physical evidence which was available after the accident?

A. I don't believe so.

Q. Why is it important that the hydraulic system on an airplane remain uncontaminated?

A. Primarily because the abrasive particles of debris cause premature wear. Much of the abrasive particle, sand or silica, which wears out even hard plated metal surfaces.

Q. Can you tell us by some type of description what size filters are in this system to catch such contaminants?

A. Okay. Starting at the Moog valve, the first filter we encounter is fully built into the Moog valve to protect the flapper nozzle stage of the valve. That is a screen which (p. 490) has openings of approximately one hundred microns in size. We call it a rock catcher, not a filter.

Moving up stream from there in the inlet pressure to the main rotor servo itself, is another screen. So all the incoming hydraulic oil that enters the servo has to go through a hundred micron screen.

Moving up stream from there, we come to the main hydraulic pressure side filter, which is a good size cartridge, and ultimately has a five or ten micron absolute filter element in it which is a metal type filter.

Q. Would a contaminant the size of this chip have been stopped by one of those filters?

A. Both the screens and the filter would stop this chip.

Q. And would it be only when the power piston or the trim piston was out of position that those filters would not be in place to stop this?

A. I think it would be fair to say the system would have to have been opened up some way perhaps by maintenance, to introduce a chip of this size.

Q. And if you cannot tell us what in your judgment caused the accident, can you exclude everything related to the flight control system?

A. I am not sure with complete certainty I can exclude the two-inch bias of the co-pilot's cyclic stick.

Q. Beyond that, seeing the physical evidence after the (p. 491) accident and knowing how this system is supposed to work, can you exclude any other problem with the flight control system?

A. Yes, sir

Q. No further questions, Your Honor.

The Court: Cross-examine?

CROSS-EXAMINATION

By Mr. Franecke:

Q. May I have Exhibit One back before the jury?

The Court: All right.

Would you step down, please.

Mr. MacLennan, you do not disagree that there was in fact a chip found in this servo in the Moog valve after the accident?

A. In a similar servo from the accident, yes.

Q. All right. So it got in there somehow, did it not?

A. Yes.

Q. It is also true there are various nooks and crannys in this Moog valve where a piece of metal can in fact lodge and stay, isn't that true?

A. I would take exception to the term nooks and crannys.

Q. Isn't there places in there where a piece of metal such as what you have just demonstrated in fact can stay?

A. There are spaces adjacent or between the land, yes.

Q. And isn't it also true there are filters on the incoming lines going into the servo?

(p. 492) A. There is a filter on the manifold panel that delivers high pressure hydraulic oil to the servo.

Screens the inlet to the servo and there are screens up in the flapper stage of the Moog valve.

Q. Are they of a sufficient size to stop that chip or piece of wire from getting into the system?

A. Yes, sir, they are.

Q. And if they were found in fact after this or after the actual servo on the aircraft was torn apart, that would indicate that that chip didn't go through those screens, isn't that true?

A. Yes, sir.

Q. And so the chip which was found torn apart at that had to come from some place down stream of the filters that are actually on the inlets here?

A. With one possible exception.

There are no filter screens on the return lines. Under some conditions of maintenance there is back flow in the system, and through mismaintenance it would be possible for a chip to enter through the return port and work its way up to that location and not go through a screen.

Q. You mean the chip is going to swim up stream?

A. If the system is not pressurized the system has been opened for maintenance, and if there is a siphon effect some place else in the aircraft back in the tail or elsewhere, it (p. 493) is physically possible, and there are cases on record ~~occurring~~, that contamination has entered through an unfiltered return line, but it is highly unlikely.

Q. Highly unlikely.

Did you review anything in your investigation that indicates that the specific servo that was on the specific aircraft while it was with the Navy had any possibility of introduction of the chip through the screens into the servo itself?

A. Not through the screens.

Q. Not through the screens. Was there any indication that any part of either the Moog valve was taken apart or any other portion, power pistons, sloppy links, et cetera were taken off that servo when it was with the Navy on the actual aircraft, not including Pensacola?

A. I did not review the specific maintenance data, so I shouldn't comment on that.

Q. All right.

If there was no removal of any of the Moog valve, pistons, et cetera, while the aircraft—while the servo was on the aircraft, and I am not including Pensacola, would it be your opinion that it would be highly unlikely that that piece of chip could have possibly swum up stream and found itself lodged finally through all to of this mechanism back up here in the Moog valve?

(p. 494) A. I would agree with that, with the possible exception of installation of the servo itself. When the servo is a unit as we see it here is carried out to the aircraft and put on the aircraft, the servo is in various stages of being inverted and what not. The port are opened to the servo, and the distance from the return port on the servo up to the Moog valve is somewhat vulnerable.

Q. By port, do you mean these two internal, these three one incoming outlets?

A. Yes, pressure and return on each side.

Q. We can eliminate one side of it because we found the chip on the independent side, so we are only talking about two openings, aren't we?

A. Right.

Q. One opening has a filter?

A. Right, and one is unfiltered.

Q. Which was found after the accident not to have any hole in it?

A. Agreed.

Q. So the chip couldn't have come in through it? Through that one.

A. Yes, sir.

Q. So possibly you might have come in from the outgoing filter, isn't that right?

A. From the out.

(p. 495) Q. From the outgoing line?

A. From the return line.

Q. Isn't it also your testimony that there is tremendous amount of pressure forcing that chip down stream like a cork.

A. Yes.

Q. So isn't it—wouldn't it be your opinion then it would be highly unlikely that the chip could have been intro-

duced in the installation by the U.S. Navy on the subject aircraft?

A. Well, if I take this port off and this port off, and I work this piston I am actually creating suction, I am actually as I move the piston back and forth through the cylinder sucking oil first from one side and then from the other side. And if I had a chip sitting here, a machine chip or chip from some other source and I stroke this servo I could pull the chip in.

Q. If that is done?

A. It is possible.

Q. In other words the fellow has to sit there as he, before he powers it up and before this is all put into all those links down there for the pilot, he has got to go there and go like this for a while?

A. Yes, sir.

Q. Do you think that is likely?

A. I think it is not very probable.

(p. 496) Q. So wouldn't it be your opinion that the chip couldn't have been, probabilities, could not have been introduced by the Navy when they installed it onto the subject aircraft?

A. Low probability.

Q. Low probability.

Now, let's talk about Pensacola.

You will agree with me that Sikorsky had the entire servo, one like this, but the actual one on the aircraft totally apart, is that correct?

A. At the time of construction or—

Q. The rework.

A. Okay.

Q. The total repair.

A. I am not aware of that.

Q. Have you reviewed the various—

A. I am not familiar with the maintenance history.

Q. Oh, I am sorry.

Are you aware of what the maintenance history on this particular, the particular valve itself was at Pensacola?

A. The particular servo at Pensacola?

Q. Yes.

A. I believe they did work on the seals at Pensacola.

Q. All right.

Do you also, are you also aware there was a quality audit that indicated they do not use this type of wire down (p. 497) in their clean room in Pensacola?

A. I am aware there was testimony earlier to that effect. Yes, sir.

Q. And, sir, are you aware or do you know what actually happens up at Moog when Moog does the work on the servo back, on the total rework?

A. In terms of Moog working on this portion of the valve. I am not aware of the details on that.

O All right. Thank You.

Q. How much does this weigh, by the way?

A. I haven't weighed it.

Q. Do you have an estimation?

A. I would estimate 15 pounds.

Q. 15 pounds.

How much force was required—

The Court: Counsel, return to the lectern.

Q. I am sorry.

How much force is required to overcome a hard over, sir?

A. A hard over in the power piston would be 199 pounds at the servo, or 55 pounds at the stick grip to move against it.

Q. 55 pounds?

A. To move against it. Just to hold it would be somewhat less.

Q. So it would take the pilot 55 pounds of force to push (p. 498) against this?

A. Yes.

Q. Now, assuming he stays on that particular servo and he starts pushing, when is the shear pin supposed to break in that 55 pounds of force he is putting onto the stick?

A. Well, there is a couple of things that have to happen. There is some wind up in the system, and there is strain energy to put into the shear pin. I would think

something on the order of two or two and half inches of stick motion, but I haven't measured it.

Q. Well, what I am getting at is, it takes approximately 20, I think you said 13 to 25 pounds to shear the shear pin?

A. Right.

Q. Is that in addition to the 55 pounds?

A. No, sir, they are series elements, so that the force that the shear pin sees, the power piston also sees.

Q. I see.

What if he has a jam on the actual Moog valve, would he still require 55 pounds to overcome it?

A. Well, unless he had an actual jam on the Moog valve, I don't think he would be able to see any force on the stick.

Q. Well, let's assume he had this jam on the Moog valve. What force with that—would that pilot have to use on that stick to overcome that jam?

A. The jam on the Moog valve?

(p. 499) Q. Yes.

A. Okay, the worst jam I can conceive on the Moog valve is a piece of very strong wire, perhaps a hundred thousandth P. S. I. shear stress, inserted right in the port of the valve, and the biggest wire that will fit in the port say 18 thousandths in diameter, and that would probably take a pound or two on the stick.

Q. Let me turn it around a different way, sir.

How much force would a pilot have to input if you artificially had the Moog valve open driving the power piston anyway you want to open it, how much force?

A. Independent of a wire jam or metal jam?

Q. That is right. How much would he have to push against it?

A. 55 pounds on the stick grip.

Q. 55 pounds.

So you indicated that you believed that the pilots were pushing very hard.

A. Yes, sir.

Q. Do you have any explanation as to why they were not able to overcome the force that was forcing the stick over to Captain Tussing's right leg?

A. No, I don't.

* * *

(p. 507) Knute Hansen testified as follows:

DIRECT EXAMINATION

By Mr. Booker:

Q. May it please the court, Mr. Hansen is an employee of Sikorsky, and he has been designated as an expert witness. I would like briefly to summarize his experience.

Mr. Hansen has a Degree of Associate in Aeronautical Engineering in 1955. Bachelor of Science in Aeronautical Engineering from the University of Michigan in 1975. A Master of Science in Mechanical Engineering from the Uni-

versity of Bridgeport in 1964. He has been involved at Sikorsky for 28 years in the field of helicopter design.

At first he worked in the advance research branch of Sikorsky. His assignments included conducting wind tunnel tests and analysis of advance motor systems, tilt rotor and propeller systems and tilt wing propeller systems. During the last 20 years he has been involved in control systems and handling qualities of aircraft. During this period he was involved in the design, development and testing of the Blackhawk, the R. H. 53, the CH-53 E. The U. H. 68 (p. 508) Blackhawk, the S. 76 and the S. H. 60 B. Seahawk Helicopters.

Your Honor, we expect to offer Mr. Hansen as an expert on computer simulations of flight qualities and characteristics, particularly as they relate to the control system.

The Court: Ladies and gentlemen, you will have his resume as an exhibit in the case. I am ruling that he, again, is an expert and as such will be permitted to give his opinions of the discipline of computer simulations as it relates to a helicopter control. So you will accept his opinions as proper evidence in the case. Proceed.

By Mr. Booker:

Q. Mr. Hansen, please state your name and residence address.

A. Knute Cooks Hansen, Whitewood Drive, Shelton, Connecticut.

Q. By whom are you presently employed?

A. Sikorsky Aircraft.

Q. What is your present position?

A. I am a staff engineer, supervisor of flight mechanics, handling qualities section.

Q. What are your present responsibilities?

A. My present responsibility is to follow the production of all aircraft as far as handling qualities are concerned, (p. 509) and also responsible for defining the handling qualities of planned production aircraft.

Q. Does Sikorsky use any computers or similar devices to simulate flight patterns and flight characteristics of aircraft?

A. Yes, it does.

Q. Could you explain to us what use Sikorsky makes of simulations?

A. First, simulation is a full mathematical representation of the model of the aircraft and therefore is programmed on computer. And you can use it, we use it in many different ways. We use it to generate design loads for the aircraft before it is even built, and this is used by the stress people to design each component on the air frame, the rotor head and so forth.

It is also used to predict the flying qualities. It is used to predict the control ranges required for all of the flight regimens which it is called to fly in, auto rotation, which is a power off condition, a descending condition.

Forward flight, sideward flight, rearward flight, climb. It is used for accident investigation. It is used to support flight tests and in determining what kind of flight testing we should do to guarantee or to make sure that the aircraft is safe and has adequate control for all of the conditions that it is called to fly under.

(p. 510) It is used to also design the flight control system and ranges.

Q. What confidence does Sikorsky place in its simulators?

A. I think very high confidence.

Q. Are simulators of the kind that you have described also used by other aircraft manufacturers in this country?

A. Yes, but they are their own models. They are their own simulations. This simulation we have provided to NASA, AIMS, one being of the Blackhawk and one being of our R. S. R. A. which is a research aircraft. And this is used by NASA to represent those aircraft and in determining the test programs that they will fly.

Q. What has been your personal experience with design and flight simulations?

A. Well, it really has been twenty years of experience in flight simulation. It has covered the development of the model itself, development of the equations of motion of the rotor, the equations to represent the rotor and so forth.

I have followed the development of this simulation for 20 years.

Q. Do you routinely use simulations in your present work?

A. Yes, I do.

Q. Were you asked on behalf of Sikorsky to make certain studies of the accident involving Bureau Number 157151 off Virginia Beach on April 27, 1983?

(p. 511) A. Yes, I was.

Q. Approximately when were you called upon to assist in that investigation?

A. I was called by Bocherelli, who at the time was the engineering project manager on the 53 D., requested that we do some calculation for him using the simulation.

Q. Did you do so?

A. Yes, we did.

Q. What information, in addition to whatever Mr. Bocherelli supplied you, have you had in preparation for your testimony here today?

A. I have looked through the deposition of the pilot and the crew on board.

I have head "My Time," I think it was, which was an article written by Tussing.

Q. Based upon that information, did you conduct certain simulations about the described flight path of this aircraft?

A. Yes, I did.

Q. Based upon the information you have received, assume that this aircraft had had a hard over to the right, assume that the aircraft was in a descending right turn from between 200 and 275 feet. Assuming that it struck the water and did not recover from that turn completely. And assume that it took five seconds or so to make that descent, have you made any calculations as to the attitude, and by attitude I mean (p. 512) the position of the aircraft that that aircraft would have taken before it hit the water?

* * *

(p. 513) By Mr. Booker:

Q. Do you have an opinion what attitude the aircraft (p. 514) would be in before it hit the water?

A. Yes, sir, I do.

Q. And what is that?

A. May I have the model?

Q. Yes.

A. If he was flying, and the assumption I made initially was that he would be flying wings level, and if he experienced at that point a full drive of the stick to the right, which causes the aircraft to roll right, within five seconds he would have been rolled upside down and started around this way to nearly 90 degrees from the vertical in the opposite direction. He would have landed up like this within five seconds.

Q. And you heard the testimony in court. Did the aircraft land upside down?

A. No, it did not.

Q. Then what conclusions do you draw from that?

A. That he did not experience a hard over.

Q. You mentioned the stick driving to the right. How does that affect the path of the aircraft?

A. It would cause the aircraft to lose altitude and to roll.

Q. Which direction would it go?

A. In roll it would roll right.

Q. And if you wanted to go to the left, how would you (p. 515) make the aircraft go to the left?

A. You would correct that input by pushing the stick to the left.

The Court: This is the cyclic stick?

A. The cyclic stick, yes, Your Honor.

By Mr. Booker:

Q. What is the basis of your calculations as to the position the aircraft would be in?

A. The basis was from a level flight condition with the stick being driven at the servo limit, which is a hundred percent per second, which would be the result of a hard over, full authority to the full right and it was based on simulation, a time history of the flight path.

Q. Had the aircraft been in a hard over so that it would make that maneuver, what would happen to anybody standing up in the back of the aircraft without a safety belt?

A. I think initially as the aircraft—this would be a very violent maneuver, the rate of roll would be about 55 degrees per second.

Initially I think anyone standing in a cabin would have been thrown on the floor, and as he passed through 180 degrees I think that person would have landed on the ceiling of the aircraft and then been thrown on the other side as he came around. It would be a very violent maneuver.

Q. Did you hear captain—did you hear Sergeant Tubbs' (p. 516) testimony here about what happened to him while the aircraft was descending toward the water?

A. Yes, sir, I did.

Q. What conclusion do you draw from the fact that he was not thrown off his feet before it hit the water?

A. That is did not experience a hard over.

• • •

(p. 518) Q. Did Dr. Packman yesterday talk about a force of 55 pounds as in connection with a hard over?

A. Yes, he did.

Q. Does that have anything to do with this particular channel of the aircraft?

A. No, it does not.

Q. Does this exhibit then, P. X. 20, have anything to do with the forces that were involved or might have been involved if there had been any kind of malfunction of the roll servo system?

A. No, it does not.

• • •

(p. 520) Q. By the way, are you a helicopter pilot?

A. No, I am not.

Q. Have you ever flown a CH-53 helicopter?

A. No, I have not.

Q. Do you have any idea what really happens in a helicopter when you move the stick around between your legs?

A. From an analysis, yes, I do.

Q. Analysis?

A. Analysis.

Q. Theoretical?

A. Theoretical, yes.

(p. 521) Q. In fact, sir, can you describe for me what the pilot was doing in the movie that you referred to as they dove and started up and rolled the helicopter, what was he doing with the stick at that time?

A. As he dove he would have had to push the stick forward. As he came back he would have had to pull, to bring the nose back up he had to pull it back. And to roll he would have to—if he was rolling right he would have to move the stick to the right.

Q. Isn't it also true, sir, that he has pedals down on the floor?

A. Yes.

Q. What was he doing with those?

A. He would probably be trying to maintain zero slip on the aircraft.

Q. So he would be working the pedals back and forth as you go through the attitude like this and around?

A. Yes.

Q. Isn't that true?

A. Yes.

Q. Also what was he doing with his collective to help pull himself around?

A. To pull up he may have been pulling up on collective.

Q. He would be pulling up on collective. All of these things were happening to make that helicopter do a maneuver (p. 522) such as this?

A. Yes.

Q. That is even theoretical, isn't it?

A. That is theoretical from my experience, yes, sir.

Q. Now, Captain Tussing testified live that he was already in a turn?

A. Yes.

Q. At about 200 feet, and the stick continued past where he wanted it to go and the aircraft continued to turn. Isn't that consistent in theory?

A. Yes, it is.

Q. And isn't it also consistent that Captain Tussing while this was taking place was trying to fight against that particular maneuver with all of the other controls he had, wouldn't you think theoretically that would be consistent?

A. Theoretically with all of the other controls, not necessarily.

Q. You don't think it is a theoretical or possible that he would be trying to use the other controls to get out of what was obviously becoming a very dangerous situation?

A. I think he would be using the other controls to maintain control of those axis about which they are affected, yes.

Q. From a theoretical standpoint if Captain Tussing didn't have something wrong with those controls wouldn't it (p. 523) have been theoretically possible that he could have pulled out of that condition he found himself in at or below 200 feet to the water?

A. Would you please repeat that?

Q. Certainly. If there was nothing wrong with the controls in the helicopter, isn't it theoretical and theoretically possible that that United States Marine pilot with his experience as a commander would have been able to pull that helicopter out of the condition that he found himself in going to the water and ultimately crashing?

A. Yes.

Q. Theoretically, of course?

A. Yes.

Q. So theoretically the correlarly or opposite is also true, that there has to have been something wrong with the helicopter controls or else the pilot would have pulled it out, isn't that true?

A. Not necessarily.

Q. Why not?

A. Because, if there had been something wrong with the controls, he had the ability to over ride those forces that might have caused that.

Q. Yet he didn't practically, did he?

A. That is correct.

Q. So if, theory is one thing, but practicality is that (p. 524) he didn't and couldn't, isn't that true?

You read that as a fact?

A. Yes.

Q. You read that as a fact in his statement, not on his deposition but in his statement he couldn't pull out, isn't that true?

A. That is true.

Q. One final thing.

With regard to Exhibit 20, the over ride forces that are indicated in here, I note that the title of Exhibit 20 is automatic flight control systems, paren AFCS, detailed specifications for. Is that correct?

A. Yes.

Q. That covers the entire AFCS system, does it not?

A. Yes, it does.

Q. And I looked at the area in which you said that we were only talking about the collective and the yaw channel and I don't see any limitation in the preceding paragraphs or in the preceding paragraphs that relate this only to the trim piston. I believe it is talking about the entire AFCS system, are they not?

A. That is true.

Q. And actually, sir—

A. But the forces below refer directly to the trim system.

(p. 525) Q. Yes, that is correct.

A. The first statement refers to the fact that it shall be possible to over ride.

Q. I agree. It speaks for itself?

However, my next question is, sir, it is stated here by Sikorsky that under the worst malfunction of the AFCS for the collective it will take eight pounds to get out of it, and for the yaw it will take 30 pounds yaw being utilized by the pedals, isn't that correct? Page 8, sir.

A. Yes.

Q. Page 8?

A. Yes.

Q. Well, sir, where does it say—where does Sikorsky actually represent what it is going to take to get out of the roll under the worst malfunction of the AFCS?

A. I am not sure.

Q. That is not in here, is it?

A. No, it is not.

Q. You reviewed this document?

A. Yes.

Q. It is not here?

A. No.

Q. They never told anybody?

A. Not in this document.

Q. They did not tell the Navy what and how much it would (p. 526) take to get out of the worst malfunction of the roll AFCS servo system, did they?

A. Not in this document.

Q. Is there some other document where they told them what the poundage would be out of the worst malfunction?

A. I am not sure if there is or not.

Q. No further questions.

The Court: Any redirect?

Mr. Booker: Yes, Your Honor. I do have some redirect in light of Mr. Franecke's cross.

REDIRECT EXAMINATION.

By Mr. Booker:

Q. Mr. Hansen, did you also do some calculations based upon the information that you got from the JAG Manual Report as to how much altitude it would have taken Captain Tussing to have pulled out of this maneuver in which he was?

A. Yes.

Q. What did you conclude from that simulation?

A. That it was possible, starting at 275 feet to have recovered if he had sheared the pin if he had over ridden any clog in the valve.

Q. How close was he to recovering even under all the conditions that were observed here?

A. Would you please repeat?

Q. Yes. You said that your calculation showed that had (p. 527) he been at 275 feet he could have recovered?

A. Yes.

Q. And so how close was he to recovering here?

A. I believe it was—if he had over ridden the hard over, if there was a hard over, it would have—I think it was less than a hundred feet he would have pulled out.

Q. Had he been at a 500 foot altitude when he began this maneuver, what did your simulation show?

A. No problem in pulling out whatsoever.

Q. And so the question was asked if there was nothing wrong with the controls, he could have pulled out, in fact what did your simulation at different altitudes show?

A. The higher you are the easier it is to pull out.

* * *

Thomas R. Conroy testified as follows:

DIRECT EXAMINATION

(p. 528) By Mr. Booker:

Q. Mr. Conroy, please state your name and residence address.

A. Thomas R. Conroy, and my address is 94 Shepard Street, Stratford, Connecticut.

Q. What is your educational background?

A. I have a Bachelor of Arts Degree in English from the University of Michigan.

And a Master of Science Degree in Systems Management from the University of Southern California.

Q. By whom are you presently employed?

A. Sikorsky Aircraft.

Q. What is your present position with Sikorsky?

A. Senior Systems Safety Engineer.

Q. When were you first employed by Sikorsky?

A. 1977.

Q. By whom had you been employed before that?

A. United States Marine Corps.

Q. What was your active duty career briefly?

A. I was a pilot in the United States Marine Corps with the primary duty of Aviation Safety Officer.

A flew in the United States Marine Corps in Viet Nam in 1969. And I subsequently went to the Naval Post Graduate School to become a designated Naval Aviation Safety Officer.

I had several assignments in which aviation safety was (p. 529) my primary duty both in squadron and air group.

Q. How many flight hours have you had in helicopters?

A. Approximately 23 hundred.

Q. Are you familiar with the CH-53 D. helicopter?

A. Yes, sir.

Q. Had you ever had occasion to fly that?

A. No, I have not.

Q. In 1983 were you asked by Sikorsky to attend the investigation of the crash of Bureau Number 157151?

A. Yes, sir.

Q. When were you notified about that?

A. I am not sure of the exact time. I believe it was within a day or so after the mishap.

Q. What did you do?

A. As I recall best, I first contacted the Naval Safety Center at Norfolk, Virginia. And I requested permission to assist the Mishap Board in the investigation of the mishap.

We received that permission. And following that I departed Stratford, Connecticut for Norfolk, Virginia.

Q. Had the aircraft been recovered at and brought ashore by the time you got to Norfolk?

A. No, it had not, sir.

Q. Where was the aircraft when you got there?

A. When I got to Norfolk, I went down to meet the aircraft at the dock at the Norfolk Naval Base near the Air (p. 530) Station, and the aircraft had not yet arrived on shore.

Q. Did you wait around until it arrived?

A. I waited. It was due to arrive that night about midnight. I waited until 4:00 A.M., and I was with another man from Sikorsky. We then drove back to the motel and he got some sleep, I guess I caught a few minutes sleep, and then I went back to the dock about 5:00 A.M. and the aircraft had arrived.

Q. What happened immediately after the aircraft arrived?

A. As soon as it arrived, when I got there it was basically being unloaded from the ship onto a flat bed truck. It was then taken over on the truck to one of the hangars at the Norfolk Naval Air Station.

Q. Did you go to the Naval Air Station and inspect it there?

A. Yes, sir.

Q. Who was with you from—well who was with you?

A. Mr. Jerry Clemons was with me from Sikorsky Aircraft.

Q. Was there any one there from the Navy?

A. Yes.

Q. Who was the—who was or were the Naval Personnel present?

A. There was a Mr. John Combs, who was the investigator in charge for the Naval Safety Center. I don't believe he is on active duty in the Navy, but he represents the Navy as an (p. 531) investigator for the Naval Safety Center. There was also a Marine Officer there who represented the Mishap Board.

Q. Was Mr. Terry Fox there at the time you got there?

A. I think he was, yes, sir.

Q. What was the first thing that the investigating group did?

A. Basically the first thing we did was bring the aircraft into the hangar at Norfolk, and left it basically, or much of it on the flat bed truck.

And we had a discussion fairly briefly of our overview of the mishap. I believe I had worked with Mr. Combs before and our plan was to basically over-view the mishap, get a good look at it, and then again to systematically analyze the systems of the aircraft.

Q. While you were there did you or did anyone in your presence operate the controls of the aircraft?

A. Yes, sir. We moved the controls, not with power, but mechanically we moved them.

Q. Did you have any difficulty of any kind in moving the controls?

A. No, sir.

Q. What conclusion did you reach from that?

A. We were basically at that point looking regarding the controls, mechanical movement, and two things were our primary interest. One was the possibility of a jam, and (p. 532) secondly mechanically the possibility of a disconnect.

And we didn't find any evidence of either a jam or a disconnect in the mechanical system.

Mr. Francke: Your Honor, I would like to raise an objection that the question was what did he do. And the answer is in "we" form. As if he were speaking for the entire investigative board. He is not an expert and not qualified in anyway to give any opinions other than what may be his own. And not with regard to anybody else.

The Court: No, I think the point is well taken, but clean it up on cross examination, if you will.

Pin him down as to what he actually did. Maybe he saw some of these things.

Did you say a disconnect? Do you mean a linkage has come apart?

A. Yes, sir, either a linkage coming apart or a bolt though which would connect two linkages not being there.

Q. Did you yourself look for that?

A. Yes, sir.

Q. Did you see anything like that?

A. No, I did not.

Q. Did you yourself mechanically operate the controls?

A. Yes, I believe I did.

Q. And did you have any problem with the controls?

A. No, I did not.

(p. 533) Q. Did you take any photographs?

A. Yes.

Q. When did you take those photographs?

A. I took photographs throughout the investigation at the hangar in Norfolk for the first couple of days basically.

Q. Your Honor, may I approach the witness?

The Court: Yes.

Q. I show you a photograph which has previously been marked as Defendant's Exhibit 33. I ask you whether you recognize that photograph?

A. Yes, sir, I do.

Q. Did you take that photograph?

A. Yes.

Q. Did you take—where did you take it?

A. I took that at the Air Station in the hangar after the aircraft had arrived. I am not sure of the exact time, probably within the first two days.

Q. Was this the condition in which—well, first of all what is this yellow knob?

A. That is the handle that operates the escape hatch, basically, on the left side.

Q. Is that secured or wired in any way?

A. Yes, sir, it is wired by means of shear wire.

• • •

(p. 534) Q. What is this decise here with the red button on it and a gray button on it?

A. The red button is a chaff dispenser, and the gray button is a trim for the search light.

Q. And what are they attached to?

A. To the collective stick.

• • •

(p. 535) Q. When you first saw the aircraft, was the collective in the same position it is in in this photograph?

A. I believe it is, as close as I can recall, when I first saw it. I don't recall it having been moved before I took that picture.

Mr. Franecke: Objection. Move to strike the last part of that statement. He doesn't recall it being moved. He doesn't recall him moving it.

The Court: Bear in mind, ladies and gentlemen, that his testimony is limited. He didn't move it, he says, and I take it that you didn't see anybody move it?

A. That is correct, sir.

The Court: Whether they did or not, you can't be absolutely sure.

A. No. But Mr. Combs had a fairly tight control on the board, and I don't think it was moved.

By Mr. Booker:

Q. Were there still hydraulic fluids in the fluid system of the aircraft?

A. Yes, there were fluids of various sort. There were hydraulic fluids, yes, sir, there were.

Q. Was any decision made in your presence while you were there to remove those fluids for further study?

(p. 536) A. Yes, there was a decision.

• • •

(p. 537) Q. Mr. Conroy, what decision was made about the hydraulic fluids?

A. The decision on the hydraulic fluid was certainly two parts. The first decision was whether we were going to test the hydraulic system on the aircraft. I passed to

Mr. Combs Sikorsky's recommendation that we power up the hydraulic servos that were on the aircraft as best we could that were brought up from the ocean.

Mr. Combs being in charge of the board decided that we will take the servos off and have them bench tested at Pensacola at the Naval Air Rework Facility Pensacola where there they would be tested individually on a bench test.

With that decision in mind, we then took great pains to isolate the fluids that were in the servo by capping off the servos themselves and the lines leading to the servos where we could put caps on there. We brought some caps in from the 53 Outfit, Naval 53 Unit that was at Norfolk, and we capped off all of the servos, all of the inlets and outlets so that we could save the fluids. And then when we took them to Pensacola and then under the laboratory conditions they were examined there.

Q. Why were you concerned about taking this care with the fluids?

(p. 538) A. One reason we were concerned was that we did not have the cause of the mishap, and all systems were open to the speculation at that point. And we wanted to make sure that we controlled the analysis of the hydraulic system as possible. And since we were going to do it under laboratory conditions, we wanted to make sure that we had the same fluids that were in the aircraft as best we could at the time of the mishap. Considering the fact that it had been on the bottom of the ocean off the beach.

Q. Was the servo then taken to Pensacola?

A. All the servos were, yes, sir.

Q. Did you go to Pensacola?

A. Yes, sir.

Q. Were you present when the servos were bench tested at Pensacola?

A. Yes, sir.

Q. What was the result of those tests?

A. Basically the result of all the bench tests were that all of the servos worked normally. They worked in full throw, fore and aft and all channels were—there is dual channel. Both channels worked normally.

Q. How long did you stay at Pensacola?

A. I think I was there at Pensacola about three or four days.

Q. What was the group doing during that period of time?

(p. 539) A. As I said, it was a very concerned effort to me to particularly analyze the systems. And we decided that we would do it under a methodical procedure where first we—and we took each servo one at a time. First we took the fluids out of the servo and caught them in a fine filter paper, and after the fluids passed through the filter paper we caught them in a clean vile.

The fluids were analyzed, the filter paper was examined and the viles were examined. Then for the servo actuation clean hydraulic fluid was entered into each servo and the servos were bench tested with the clean fluid.

Q. How did they function when clean fluids were put in?

A. They all functioned formally.

Q. Why did you return from Pensacola to Connecticut?

A. The best I recall we came to the decision that we had not found anything at that stage with the servos. We had disassembled the servos after the bench test, and that was another part of the previous answer. The disassembly was the last part because once you disassemble the servos of course you can't bench test them. So the bench testing has to come first. We had basically bench tested and then disassembled. And as I recall it we had come to the conclusion that we hadn't found anything in this stage of the examination.

So Mr. Combs, I believe, went back to Norfolk and we were under his supervision. And I returned to Stratford. (p. 540) That is best I can recall.

Q. And when did you hear that at some subsequent date the Navy had found a chip of somekind in the Moog valve?

A. I think about two or three days later Mr. Combs called me.

Q. Were you present when that was found?

A. No, sir, I wasn't.

Q. Did you ever see that chip?

A. Yes, I did.

Q. Where was that?

A. I saw it. Mr. Combs had it when we examined the electrical system. We did a methodical examination of the aircraft electricals consisting of contamination pollution, et cetera at Norfolk a couple of weeks later. I flew to Norfolk and met Mr. Combs and met there with an electrical systems man from Pensacola.

And there I saw the chip.

Q. Did Mr. Combs have it then?

A. Yes, he did.

Q. Have you ever seen the chip since then?

A. No, I haven't.

Q. I have no further questions of this witness, Your Honor.

* * *

(p. 541) Harry F. Asbury Testified as follows:

DIRECT EXAMINATION

Mr. Booker: If Your Honor please, Mr. Asbury was designated as an expert witness. However, because his testimony would be cumulative of other witnesses, I simply wish to ask him a question in one factual area. So if I don't need to, I won't summarize his qualifications.

Mr. Asbury, please state your name and your residence address.

A. Harry F. Asbury 2412 Brook Park Road, Pensacola, Florida.

Q. By whom were you employed?

A. Sikorsky Aircraft.

Q. How long have you been employed by Sikorsky?

A. 33 years.

Q. Without going into detail about your employment, what has been the general nature of your employment over that 33-year period?

A. I have been a field technical representative for (p. 542) Sikorsky Aircraft during that period.

Q. What does a field technical representative typically do?

A. Works with the customer, which in most cases of mine have always been the military, and trouble shooting aircraft, teaching the troops how to maintain the aircraft and OJT, on the job training of how to adjust and install and remove any part of the aircraft that we install.

Q. Where are you presently assigned?

A. Navair Pensacola, Naval Air Rework Facility Pensacola, Florida.

Q. How long have you been at Pensacola Navir?

A. I have been there 13 months, sir.

Q. As such, do your duties require you to work actively with personnel, Navy personnel dealing with Sikorsky parts?

A. Yes, it does.

Q. And Sikorsky aircraft?

A. Yes.

Q. Have you at my request examined the records of purchases at Pensacola Navair over the past five years for a kind of wire known as Q. Q. W. 461?

A. Yes.

Mr. Franecke: Objection, Your Honor. Hearsay. And if the man is going to be qualified as an expert then he should be qualified as such and we will go into the matter.

(p. 543) The Court: The objection is overruled.

Q. What did your review of the records at Pensacola show?

Mr. Franecke: Further objection, Your Honor, no foundation.

The Court: Show how he received access to them.

Q. Certainly.

The Court: The usual foundation questions, Mr. Booker.

By Mr. Booker:

Q. Are you familiar with the Naval Supply System for purchasing supplies?

A. Yes.

Q. Tell us briefly how it works and how records are maintained.

A. At Navair Pensacola any purchase that is made is recorded on computer. And the computer run at the facility of all purchases of all hardware and so we ran a check on computer and found that this wire—

Mr. Franecke: Objection.

Mr. Booker: Just a second, Mr. Asbury.

Mr. Franecke: Request a side bar conference, Your Honor.

The Court: State the objection. Are you objecting to the "we," or what?

Mr. Franecke: No, Your Honor, Mr. Asbury is not an (p. 544) employee nor custodian—

The Court: Here again, I told Mr. Booker to show how he had access to it, and he was getting to it.

Mr. Booker: That is what I was trying to get to.

Mr. Franecke: I understand, all right. All right, Your Honor.

By Mr. Booker:

Q. As a Sikorsky Technical Representative do you and the other Sikorsky representatives have access to this Navy computer purchase program?

A. Yes, we do. We are on contract to the Navy to assist them in any problems they have, and these are some of the problems we have is the purchase of parts. And we do a system, so we have access to these records.

Q. Where are the records maintained?

A. They are maintained at the Naval Air Station Pensacola.

Q. And where specifically at the Air Station?

A. They are in building, I think it is 3457.

Q. Where is that building?

A. Up on the top floor is our supply section that maintains ready necessary for the fleet where we keep

the records for the parts, and then if the fleet comes in and needs a part we have to get a location, so we use all the computer system to locate the parts and then have them (p. 545) shipped out to the fleet immediately.

Q. And is that the records system to which you had access when you made the search we had requested?

A. Yes.

Q. What did that search reveal?

Mr. Franecke: Objection, Your Honor. Again no foundation being laid. We have no way of cross examining the documents. We have never even heard of these documents before this time, and when we took Mr. Asbury's deposition, he had not been to Pensacola. This witness is not qualified, nor does he have proper foundation to lay for the accuracy of those documents kept in the course and scope of business or any other manner. I am sure he will also testify he didn't do any computer runs.

The Court: The objection is overruled. You can bring all that out on cross-examination. Proceed.

Q. What did the records reveal?

A. The records reveal July 22nd, 1982 that Q.Q.W. 461 was purchased. It was also purchased in 1983, '84 and '85.

Q. Is there a supply room where material of that kind is kept at Pensacola Navair?

A. Yes, there is a major supply station, and then different shops draw their material from this point. In this particular case they buy it in bulk and re-spool it on

spools that do not have numbers on it, only the size. And it is (p. 546) taken to the different shops, if requested.

Q. And where is the supply room in relation to where the servos are re-worked?

A. The supply room is between the pump shop and the servo shop. It would be like an adjoining room.

Q. If Your Honor please, I have no further questions of the witness.

The Court: Cross examination?

Mr. Franecke: Yes, Your Honor.

CROSS-EXAMINATION

By Mr. Franecke:

Q. Mr. Asbury, you are employed by Sikorsky Aircraft, are you not?

A. Yes.

Q. And you have been so for 33 years?

A. Yes.

Q. And in fact, sir, you have not been down to Pensacola until just 13 months ago, isn't that true?

A. That is correct.

Q. You were in fact stationed up until 13 months ago back up north here, among other places, isn't that true?

A. Yes.

Q. And 13 months ago is not the fourth quarter of 1982, was it?

A. No.

(p. 547) Q. So you weren't there during the fourth quarter of 1982 in Pensacola?

A. No.

Q. And, sir, isn't it also true that the United States Navy through their quality assurance and as represented by Exhibit 11, that they also checked to see if at the time of the accident what if any ten ten steel was anywhere near their shop, are you aware of that?

A. I am aware of that.

Q. In fact concluded there is no ten ten steel that is in their shop, is that also true?

A. I am aware of that also.

Q. Frankly, sir, you testified, I believe, on direct in answer to Mr. Booker's questions that you said that they re-spool it and put it into their parts department, is that right?

A. That is correct.

Q. But you weren't there in the fourth quarter of 1982 to see this, were you?

A. They re-spool it today is what I witnessed, they did, which is normal procedures as of since I have been there.

. . .

(p. 548) Q. So you don't know what they were actually doing in the fourth quarter of 1982, do you, sir?

A. No, I don't.

Q. Did you ever inquire what they were doing?

A. Yes.

Q. What did they say to you?

A. I inquired whether procedures—I inquired about what wire they were using in the shop, and when I asked them to show me in the bin. The mechanic took me over to the supply bin which is between the pump shop and the servo shop. He reached up in the wire box and pulled out the tag wire, or similar wire, which was 13 thousandths and he looked at it and he said, this is the wrong wire. Told the supply man to get it out of the shop. And he said, we don't use that. But it was in that shop.

Q. When was this, sir?

(p. 549) A. This occurred right after you took my deposition in Connecticut.

Q. After. That was April Second of 1985?

A. That is correct.

Q. Just about three months ago or so?

A. Yes.

Q. That is when they had the wire, not the fourth quarter of '82?

A. That is when I saw that wire. The fourth quarter. There is a record in the computer that they purchased it, and we found the record.

Q. Mr. Asbury, did you see—

The Court: When did you do your computer run? I don't believe that has been developed.

Q. His Honor asked the question.

A. Sir, I didn't quite hear you.

The Court: When did you do your computer run?

A. We have been working on that computer for the last three months trying to obtain this information.

The Court: But you did it after your deposition was taken in April?

A. Yes, sir.

The Court: All right.

By Mr. Franccke:

Q. Sir, did you see that wire in fact being utilized in (p. 550) the servo shop?

A. No, I didn't see. I couldn't identify the wire. I have seen wire being used in the servo shop, but I couldn't identify what wire they were using.

The Court: Does Sirkorsky always have a representative in attendance there when they are re-working servos in the rework shop?

A. Only if they have a problem, sir. If they have a problem then they request my presence and I will come down and assist them.

Q. Who was the technical representative in the fourth quarter of 1982 from Sikorsky down at Pensacola?

A. Mr. Ron Crooker.

Q. Where is Mr. Crooker today?

A. Mr. Ron Crooker is taking rehab. He had a heart attack.

Q. I see. He is still alive?

A. Yes.

* * *

(p. 552) John L. Carson testified as follows:

DIRECT EXAMINATION

By Mr. Booker:

Mr. Booker: Members of the jury, Mr. Carson has been designated as an expert witness for Sikorsky. Mr. Carson is a test pilot for Sikorsky. Mr. Carson holds a bachelor of science from Jacksonville University in mathematics, he is a graduate of the Naval Flight School and the Naval Test Pilot (p. 553) School. He served as a Marine officer from 1971 to 1982 on active duty. Part of that time was with the Third Marine Air Wing. The rest of the time as a flight instructor, and then as a test pilot for the Navy at Patuxant River, Maryland. He joined Sikorsky in September of 1982 as a test pilot.

Mr. Carson holds commercial pilot's, instructor pilot's, airplane single and multi engine land. Licensed rotor craft helicopter FAA ratings: Total flight time is approximately 4,300 flight hours.

Q. Mr. Carson, please state your name and your residence address.

A. John L. Carson. 139 Lazybrook Road, Marock, Connecticut.

Q. Are you presently employed by Sikorsky?

A. Yes, I am.

Q. What is your present position with Sikorsky?

A. I am an engineering and functional test pilot with the Sikorsky aircraft.

Q. Can you tell us what the duties of engineering and functional test pilot are?

A. As a functional test pilot, I am one of the fellows that performs all of the final acceptance checks and makes all of the final adjustments on the brand new helicopters as they come off the assembly line prior to their delivery for inspection by the United States Navy. As engineering test (p. 554) pilot we evaluate and test all the new aircraft major modifications and changes to Sikorsky products.

Q. During your time with the United States Marine Corps, did you have occasion to become familiar with the CH-53 series helicopter?

A. Yes, I have.

Q. How did you happen to become familiar with it?

A. After flight school I was ordered to the Third Marine Aircraft Wing where I was qualified as co-pilot in CH-53 A. and D., and subsequent to that, or after that, I was qualified as aircraft commander and was sent to Wespac where I was stationed aboard a ship for about eight months.

Q. What do you mean by Wespac?

A. Western Pacific. We flew out of the Phillipines, Japan, Korea and stood by for evacuation of Saigon.

Q. How many total hours did you accumulate flying either as a co-pilot or pilot in the CH-53?

A. In the Marine Corps I have got approximately 700 hours in the CH-53, with additional hundred hours since coming to work for Sikorsky Aircraft.

Q. What were your duties as test pilot for the Navy at Patuxent River?

A. Primary job was as engineering test pilot for the CH-53 A., D. and E. programs at the Naval Air Test Center. And in addition, I was Division Systems Special Projects (p. 555) officer.

Q. How did it come about that you as a Marine officer were a test pilot for the Navy?

A. Well, the little seal for the United States Marine Corps has Department of the United States Marine Corps. In the Marine Corps you are a member of the Department of the Navy.

As far as helicopter operations go, the only test pilot school for helicopter aviators in the United States is at the Naval Air Test Center Patuxent River, Maryland. All acquisition of aircraft, helicopters for the United States Marine Corps goes through the United States Naval Air Systems Command Washington, D. C.

Q. What did your duties consist of in so far as testing the 53 A. slash D. helicopter series at Patuxent River?

A. While at a Patuxent River I managed and flew numerous projects. Of which one was the CH-53 D. with elastic rotor blades, a sister ship to the mishap aircraft where I did an evaluation on auto-rotational flying qualities with both engines pulled back at various gross weights and under various configurations with and without external

gas tanks and at varying C. G. and weight. I was night system officer where we had a special 53 equipped with sensors to permit low level night operations.

Q. What was your first assignment when you came to (p. 556) Sikorsky?

A. My primary first assignment would have been as a production test pilot. To start on just learning how you go through a production test profile on an aircraft, since I was already qualified in a CH-53 E. Following United States Marine Corps, I already met that qualification. As a test pilot it is, of course, the aircraft is a requirement that we meet all of the Navy's requirements and the Marine Corps requirements. So as a test pilot at Sikorsky aircraft as well as meeting all of the requirements by the federal aviation regulations, we are required to maintain all of the qualifications of in accordance with Op. Navy 37 Ten Point 7 series which governs the operation of military aircraft.

Q. Do you also still maintain your status as a reserve officer in the Marine Corps?

A. Yes, I presently am major in the active reserve.

Q. Were you asked to review certain documents and background material in order to be able to testify here at the trial of this case?

A. Yes, I was.

Q. What materials have you reviewed?

A. I reviewed the Judge Advocate General's investigation, Captain Tussing, at the time Captain Tussing's article from Approach Magazine. I was given a package of information that including the engineering investigation

from the Navair on (p. 557) the hydraulic contaminations. I reviewed all of the maintenance discrepancies that were in the book and available to the pilots, plus all of the maintenance discrepancies that were in the aircraft for the last six months.

Q. Were you present in the courtroom when Sergeant Tubbs testified about the behavior of this particular aircraft?

A. Yes, I was.

Q. Did you arrive in time to hear Captain Tussing testify?

A. No, I did not.

Q. I ask that the witness be shown Exhibit D. X. 23. Would you please first look superficially at Exhibit D. X. 23. Can you identify the documents which have been marked as defendant's Exhibit 23?

Mr. Franecke: That has been gone into. We know what 23 is.

The Court: Why isn't it cumulative? It goes from A. to double A., and it is the prior gripe things that have been registered against this aircraft.

Q. Yes, Your Honor. I want to establish he reviewed them as part of the preparation of this testimony.

The Court: All right. Fine.

By Mr. Booker:

Q. In reviewing them did you see anything which was of significance to you as a pilot?

(p. 558) A. Yes, I did.

Q. Specifically which of them did you find significant as a pilot?

A. I don't know what they their label is in here, but of major significance was one, there was a discrepancy in the co-pilot's cyclic stick.

The Court: That is about X., Y., or somewhere along in there or W.

W. to be exact, isn't it?

A. There it is.

Okay the co-pilot's cyclic stick leans when the pilot's stick is straight up. There is a very significant discrepancy, even though it doesn't affect the aircraft's control rig, the aircraft's cockpit and environment is designed—

Mr. Franecke: Objection, Your Honor. There is no question pending. I don't even know what—

Q. I said what significance did he attach to it.

Mr. Franecke: I don't believe that question was requested.

The Court: Well, here again, if there is no question pending you have a clean slate so ask him one. And Mr. Carson, wait until there is a question before you give an answer.

A. Yes, Your Honor.

(p. 559) The Court: Or you will get in serious trouble.

Q. What significance did you attach to the exhibit which is D. X. 23 W., excuse me, yes, D. X. 23 W.?

A. Let me once again read the discrepancy as it is written by Major Miller. It is "co-pilot's cyclic stick leans left when the pilot's stick is straight up."

As I initially began to describe, a leaning co-pilot's stick does not necessarily affect the rig of the aircraft or what you might term total control of the aircraft. But the geometry of a cockpit of an aircraft is based on having that stick at a pre-determined position with the control centered. If it is biased in any direction the guaranteed cockpit clearances are not guaranteed any more and when I say guaranteed cockpit clearances, the aircraft has to be able to perform all of its maneuvers with that cyclic stick clearing both the pilots' legs, corners of the instrument panel, the dashboard, any obstructions that would normally be cleared with the cyclic in a straight up position.

Q. What is the approximate throw of the cyclic from one—from the center position to the stop?

A. From the center position to the stop it is approximately four and a half inches, nine inches of travel, or eight point eight.

Q. What would a cyclic stick two inches off center, how would that affect?

(p. 560) A. It effectively takes away 50 percent of the control in one direction. So if you were to require a hundred percent deflection, let's say to the left, and the stick was already biased to the left, it could run into obstruction prior to the amount of control required, and effectively takes away 50 percent of the control power.

Q. I ask you now to look at exhibit D. X. 23 Y.

That relates to the flight ready light.

Did you review that discrepancy?

A. Yes, I did.

Q. What significance did you attach to that?

A. Well, let me read the discrepancy once again. "No flight ready flight."

Mr. Franecke: Objection. It is not necessary.

The Court: It isn't necessary to read. The jury has heard it. Just answer the question.

A. The flight ready light is an overhead light in the cockpit of a CH-53 that is on and green. It is a green go light as such. That when that light is on the pilot knows that the aircraft is in a safe configuration for flight. And the key term here is "safe."

Through that light is wired the blade fold system, the rotor brake system, gust lock system, pylon fold, tail rotor locking. All of those things go through here.

It is wired such that if that green light is on the (p. 561) aircraft cannot be started. You have to go to a bias emergency position to be able to get the aircraft to start.

It is designed that way for safety. When you have a rotor system as complicated as a helicopter rotor is and try to have to fold that and thread it and insure it is in a safe configuration for flight, that is a very important item.

If that light flickers during a start, once you have initiated the start sequence in the 53, which is pretty automatic—you hit a starter and put it to idle—that flight flickers during that the starter is to drop out and you can do serious damage to the engine. You can over temp or get a

hot start sequence which requires an abort by the pilot or co-pilots, whoever is starting the aircraft.

Once again, that is a safety of flight item.

Mr. Moore: There is a question.

A juror: I would like for him to go through the interlocking sequence one more time. He went through it fast, and I think I missed.

Q. Mr. Carson, would you explain a little bit more slowly exactly what that sequence is?

A. Okay. On a CH-53, it may have been in the film that you saw, your rotor blades fold and tail pylon fold so the aircraft will fit on a ship physically, that will fit on L. P. H. or L. P. D., all the amphibious ships the Marine Corps uses. To do this there is a series of micro switches within (p. 562) the system within the hydraulic system that pumps hydraulic fluid up to the hub to permit the blade and pylon to fold. There is a series of micro switches on the servos, on the rotor hub, on the locking pins that lock the tail boom into place. There is a coupling that has to come apart to take the tail rotor drive shaft. It has to come apart to fold, and there is a locking mechanism that goes out to the tail rotor hub to keep it from spinning when that tail rotor comes apart. In addition to that, there is a rotor brake may bleed down in pressure there is a gust lock which position, and then for long term storage where the rotor brake may bleed down in pressure there is a gust lock which is a little lock that goes into a fitting on the rotor brake itself to keep the hub locked.

You want to insure that you don't try to start it with either the gust lock on or rotor brake off. It is a safety

sequence to make sure the aircraft can't be started in a non flight ready situation, which is why it is a flight ready light.

That light goes away at 6 PSI and transmission oil pressure once the rotor system turns up, so you don't have a light in the cockpit.

A juror: I missed one on the gust pin. I didn't know what that was.

Thank you very much.

(p. 563) By Mr. Booker:

Q. What significance did you attach to that?

A. One that the aircraft couldn't be started in the normal position. The pilot could not use a normal start sequence to start the aircraft. If that thing flashes during the start sequence the start will automatically abort. In the cockpit on the overhead there is a switch labeled normal and emergency. You would have to go to the emergency position to start it.

Q. I now ask that you look at the discrepancy which is 23 Z., and without reading what that is, would you describe it generally and tell us whether you attached any significance to that?

A. Yes, I did.

In the case of aux fuel system, especially in a 53 with inoperable fuel gauge, that tank holds 44 hundred pounds of fuel, over two tons, and without a gauge—and that tank also was built without any kind of an access on top, so the amount of fuel in the gauge, in the tank cannot physically be examined or checked to find out how much is in there. As

one of the requirements of an aircraft commander in a—well, any military aircraft it is outlined in OP Nav 37 point 7 series again, is a requirement that the aircraft commander insure the weight and balance of the aircraft be checked and computed and all be within operating limits. With an (p. 564) inoperable fuel gauge there is no means of determining how much fuel is in that tank other than by guess work. On timing or assuming that that tank has the same amount of fuel as the gas tank on the other side of the aircraft, and without knowing that the aircraft commander doesn't even meet his own requirements for determining what the basic weight of the aircraft was when it took off.

Q. And how would that or might that affect the quality of flight or the control of flight?

A. In the event, or in the case of a lateral imbalance, the aircraft could go out of lateral center of gravity limits which would not guarantee enough lateral control input throughout the entire flight envelope of the aircraft. By entire flight envelope, that would mean from rearward 30, to sideward 35 knots, all the way out to 170 knots straight and level. The guy, the pilot, would not necessarily be able to maneuver the aircraft completely how throughout the flight regimen with an aircraft out of lateral C.G. limits. Since the tank is so heavy, the longitudinal C.G. could go out of limits based on cargo put in the aircraft. He could run out of forward or aft cyclic stick as well.

Q. I ask you now to look at double A. In that series, which is discrepancy noted the day of the accident. Tell us generally what that is.

A. This is an instance of during the rotor blade fold (p. 565) system the automatic hydraulic manifold system

wouldn't drop the rotor brake system. Let me explain a little bit. In the blade fold system when you go to blade fold the hub has to be in a certain position to permit the blade to fold and clear the engines and the aft section of the aircraft and all.

To do that, the rotor brake pressure is dropped to a very low nominal amount, and when a hydraulic motor turns the hub, when it is in position, that pressure comes back up to the normal operating pressure to lock the hub in place for the blade fold sequence. In this case the pressure wouldn't drop off automatically. Something wrong with the folded blade system, probably in the manual fold.

Q. Did you also review the report submitted by the engineering investigation relating to the contaminants found in the hydraulic system after the accident?

A. Yes, I did.

Q. What did that indicate?

A. That the hydraulic system was contaminated beyond the point of acceptable for safe flight.

Q. Had that aircraft been presented to you as a Marine pilot, what would you have done?

A. I wouldn't have flown it.

Q. Why is that?

A. One, the cyclic stick is a safety of flight item that should not have been flown. The flight ready light is (p. 566) another safety of flight item that shouldn't have been flown. I would have flown with the gas tank inoperative if they could have proved to me the gas tank was empty, and I would have made sure the other was empty

and you could have flown with internal fuel. You have two hours of range in a normally operational helicopter. They could have been flown two hours. You just couldn't use the external fuel system.

Q. Why would it have been of so much concern that you wouldn't fly it, that the cyclic was off center by two inches?

A. When considering military operations—well comparing military and civilian operation there is a requirement to do more of an excess of maneuvering for tactical operation operating around other aircraft, around ships and very adverse conditions and what not. So you want to make sure that you are—the aircraft can be controlled throughout the envelope. You you are not sure you may have to land on a landing situation or on a ship with 30 knot wind or you could be into the wind on civilian—or down a big runway or something.

Q. What is a hard over in military parlance.

A. A hard over is just what the term describes. The cyclic stick driven hard in one direction or the other. Doesn't necessarily have to be roll. It could be pitch, it could be collective, the collective could go full up. It (p. 567) would be the extreme travel of a flight control from whatever position it is at to an extreme.

Q. How would you describe the effect of a hard over on an aircraft?

Mr. Franecke: Objection. We are not discussing any aircraft, we are talking about the CH-53 D.

Q. I will limit it.

The Court: Put it in a little sharper focus, if you will.

Q. Yes.

How would a hard over in your experience affect a CH-53 D. aircraft?

A. Well, a hard over—

The Court: A right hard over specifically.

Q. Right.

A. Well, a right hard over in roll the cyclic stick would travel—when the servo goes hard over it goes at a rate of a hundred percent per—in half a second goes from middle of the control to the stop. It will go fast enough—a pilot normally holding a cyclic I think reference earlier, you were just hold them in your fingers, the aircraft flies very, very lightly.

It will jerk it right out of your hands in half a second, and that guy is up against your leg at that point. The aircraft and you saw the maneuver in the movie, it can (p. 568) move. You saw a hard over maneuver. The cyclic was up against the stop. It didn't go in half a second, probably in a second and a half or two seconds, but the response would be about the same. The aircraft would roll very rapidly, and the initial acceleration would have been enough. Take anybody off of their feet.

Mr. Franecke: Move to strike the last statements there has been no indication that this witness in fact either did that particular maneuver or did the maneuver in the movie.

The Court: All right. Well, here again, by foundation questioning show that he at least has experience of what he now speaks about.

Q. Have you experienced a hard over in an aircraft?

A. Yes, I experienced one in a CH-53. I think I was fortunate it was on the ground and the rotor wasn't

turning. In the process of doing our normal checks they have one of the Moog valves way out of adjustment and it went hard to right and hard enough to the right to bruise my knee. So it goes very fast.

As far as the actual flight response, in my evaluation or experience as a test pilot one of the test points we do is a build up to rapid roll rate to test structural integrity of modification and new fixes on the aircraft. I have seen full deflection rolling maneuvers that have not gone completely (p. 569) over. We usually start at some angle of bank to the right and then at an angle of bank to the sort I have seen and experienced a full hard over rolling maneuver. And believe me, it is enough to blur the horizon.

Q. Based on what you heard Sargeant Tubbs testify about, and what you have read from the statements made by Captain Tussing, did this aircraft experience a hard over before it hit the water?

A. No, sir, it didn't.

Q. Why do you say that?

A. The maneuver itself as described, not even by the aircraft commander, Captain Tussing at the time, or the crew in the back, but described by numerous witnesses outside of the aircraft that were in statements that are in the Jag investigation, the aircraft maneuver was very docile. And it was not a pure rolling maneuver. From the time it started its maneuver to the time it settled in the water the whole maneuver was very, very docile.

Q. What do you mean by docile?

A. It was slow enough not to knock anybody over, and in a lot of cases not to even excite the people watching it.

"I thought the aircraft was making a turn and ended up in the water."

Q. Based upon all of your studies, do you have an opinion as to whether this aircraft could have been brought back (p. 570) under control?

Now the question is only whether you have an opinion?

A. Yes, have an opinion.

Q. What is that opinion?

A. That given sufficient altitude the aircraft could have been recovered.

Q. Based on the maneuver which the aircraft was executing at that time, did it have enough altitude to recover?

A. No, it didn't.

Q. In reaching that conclusion what assumptions have you made about the altitude?

A. The aircraft was at or below 300 feet is the assumption I made initially.

Q. What is the significance of 300 feet in so far as approach to a helicopter—to an aircraft carrier is concerned?

A. The helicopter landing pattern is at 300 foot altitude. That is usually the point at which you check in and start a descent to your ship, L. P. H. type ship. The deck is 60 feet, so you have only 240 feet of clearance. The L. P. D. is a little lower, and I am not quite sure of the deck height.

Q. What is the difference between those two ships?

A. The L. P. H. is a helicopter carrier as such. It is about 6 hundred feet long and the flight deck is 60 feet (p. 571) above the water.

Biggest difference is it is configured like a carrier. On the right side of the flight deck there is an island with superstructure and radar and all this stuff. The controlling agency the ship's captain is in the front, and there is aircraft controller in the stern of it.

And all the traffic patterns are left-hand patterns, that is racetrack pattern, 300 feet. All approaches to the ship during day time operations made at 45 degree angle to a specific landing point along the ship.

You can by doing that they can operate multiple aircraft.

Q. Why is it necessary or usual to make a left-hand approach?

A. One thing that is common to the U.S. Navy, and the Navy or captain of the ship is really the one that dictates it, they do not permit with you aircraft, even a fixed wing, to ever cross the bow of the ship. In the event of a mishap the ship isn't maneuverable enough to keep from running you over. They don't want you in front. The air boss sits in the back, if he loses sight of you. So all of the traffic patterns for a LPH are left-hand patterns. The L. P. D. on the second point has both of its landing spots, there is only two spots at the stern of the ship. The approaches are made at 45 degree angle either port to starboard or starboard to (p. 572) port. In the case of a port to starboard approach it requires a right-hand turn for wave off, which is contrary to most of the approaches flown in the U.S. military. The majority are left-hand.

Q. From an LPH, if a wave off is necessary, in what direction does one turn?

A. One initially pulls in power to check rate of descent and then turns left.

Q. In a L. P. D. when a wave off is necessary, what is the direction of the turn?

A. In a port to starboard approach as described in Jag investigation it would be the same, pull power and you would make a right-hand turn to cross the stern of the ship and not go near the bow. Never over fly the ship is the other cardinal rule.

Q. According to the records that you have reviewed and the information made available in the Jag report, had the co-pilot, Lieutenant Boyle, made any landings aboard an LPH before this day?

A. From what I had read, no, sir, I can't be determined that he made any landings. From my experience with the H. 53, and evaluation, they do not permit left landings. The rotor wash is such that the crewmen could be blown overboard.

Q. From your review of the records, had he ever made a landing aboard an L. P. D. before?

(p. 573) A. No, sir, he didn't.

Q. Was that a part, indeed, of the exercise that day, to give him an opportunity to see such a landing?

A. In Captain Tussing's statement and Jag investigation he stated that it was a good chance for Lieutenant Boyle to become carrier qualified period. And I implied from that that he had never been qualified before, but he

was going to be qualified aboard an L. P. D. and L.P.H. Those would be the first landings he had seen.

Q. Why did you reach the conclusion that this aircraft could have been brought back under control?

A. Based on the computation that I made, I called Norfolk weather and got ambient conditions at the time of the mishap and figured a basic fuel weight condition the aircraft based on a full up two external tanks and burning down 32 hundred pounds of fuel over the next four hours 20 minutes. The aircraft was approximately 33 thousand pounds or 33 thousand 9 hundred pounds and at that time a power, if the aircraft is brought to hover it would climb straight up at 30 miles an hour. It had that much excess performance.

Q. But this aircraft did not survive, did it?

A. No, sir, it didn't.

Q. Have you heard anything in the court-room this week that for the first time gives you an indication of what actually happened that day?

(p. 574) A. Yes, sir.

Q. What is that?

A. Do you want me to go through the—

Q. Explain what testimony you have heard here this week which gives you a clue as to what happened.

A. I think the key testimony that I have heard here, and it also comes out of the Jag investigation, is that sometime from the time that the aircraft wave off was initiated, or the go-around was initiated there was a transfer of

flight control from the co-pilot to the pilot. But I don't feel that the transfer took place in a smart and efficient manner, if it took place at all.

Q. Did you hear Sargeant Tubbs testify?

A. Yes, I did.

Q. Did you hear him testify that Captain Tussing had said he was taking the controls, and then after that, that Lieutenant Boyle said, I can't get enough left cyclic?

A. Yes, I did. And the Jag investigation states that, also.

Q. What significance do you attach to the fact that Lieutenant Boyle is talking about getting left cyclic after the captain has taken over control of the aircraft?

A. The main significance I put to this, and I have seen it personally in instructing situations in the past, Lieutenant Boyle I feel was probably doing a left-hand wave (p. 575) off. All the approaches he had seen as co-pilot had been left-hand wave off. There was no time allowed for him to be briefed on operations around and L. P. D. went from holding pattern on the ship directly to L. P. D., when he said he was going to wave off, it was probably a good wave off and decision—he tried to turn left. The air commander, he knows what the turn is he is trying to turn right. When he tried to turn right the co-pilot was still hanging on to the controls trying to turn left. That is the first evidence of somekind of binding, that it was two people doing different things on the same set of flight controls. And it is not an unreasonable situation in dual piloted aircraft.

Q. What happens when one pilot is trying to turn right and the other pilot is trying to turn left?

A. If they pull at the same amount, nothing. The aircraft will sit there.

Q. Suppose, one of them were suddenly to release the controls?

A. Oh, boy. That would be like somebody dropping the emergency brake off on the car when you hit the gas. It would roll good. It would roll in that direction, in a hard over the direction the guy was pulling.

Q. Based on everything you heard and read and all the background, how does that strike you as the explanation for this accident?

(p. 576) A. It seems to me the most logical sequence of what could have taken place based upon the fact that I don't feel there was anything wrong with the aircraft other than the shoddy maintenance points that were brought out.

Q. In this final maneuver how, if at all, would the condition of the cyclic being two inches off center affect the operation?

A. I think what I would have to do is describe the wave off maneuver. If you were to start a wave off, the first thing the aircraft commander is going to do or pilot initiating wave off is going to raise the nose and check his rate of descent, probably increase a little bit of power. To this he has adds a little bit of aft cyclic. He will start a right-hand turn. At that time, and if the co-pilot is hanging onto the controls or turning left, et cetera, let's go of the cyclic stick the aircraft is meanwhile slowing from an initial air speed of somewhere between 45 and 50 knots and may even have been slower, a little slower, the nose up will allow the aircraft a little bit more nose attitude, but the

nose, the slower it goes, so the aircraft is initially slowing and then it rolls right. And at that point as an aircraft slows down, normal position of a flight control is aft with air speed. And as you go through the various slow air speed hoovers the cyclic stick then comes back towards the middle. As the aircraft slows down, it is going to go (p. 577) aft. And as you roll into a turn to roll out of it, it is going to require left cyclic stick. If the co-pilot was still on the controls and his feet up on the rudder pedals with the cyclic two inches to the left there is no way that cyclic will clear his thigh. It is going to hit cyclic up against his leg. May be back to center, may stay a little to right, which may prevent him from pulling out.

Q. Let me show you now a photograph which has previously been marked as exhibit 33.

May I—this would require taking it over to the jury.

The Court: Fine, come on over.

Q. Mr. Carson, what is this device with the red button on top?

The entire device?

A. This is the co-pilot's collective control on the left-hand side of the aircraft.

Q. When this aircraft was originally supplied by Sikorsky to the Marines, did it have all of these devices on it?

Mr. Franecke: Objection, no foundation being laid for this witness knowing how this aircraft was in fact supplied.

The Court: What can you supply.

Q. I can supply that he evaluated the change to this, Your Honor.

The Court: All right. Proceed. Objection is (p. 578) overruled.

Q. All right. When this aircraft originally came out, did it have all of these devices on it?

A. No, it didn't.

Q. Which device was missing?

A. The A. L. A. 39 flare chaff dispenser button on the left-hand side.

Q. Is that the thing beneath the red button?

A. Yes, the red button is actually part. The thing below is the mount for the button.

Q. And when did—when, approximately when did that enter the fleet?

A. I first saw it being engineered at Naval Air at Patuxent River, Maryland in, I want to say '79 or '80 time frame.

Q. What is the purpose of that?

A. For combat situations in the new missile environment with the heat seeking missiles and what not, aircraft is now equipped with flare chaff dispenser on the aft part so in the event of a missile threat if the crewmen, pilot or co-pilot or anybody sees a flash from a rocket motor he can hit this and it jettisons flares and chaff out the side of the aircraft to lead a missile astray. So it has to be pretty near a primary flight control or something a guy can reach in at a matter of seconds.

(p. 579) Q. What role, if any, did you have in the Marines and in participating in that change?

A. I looked at it, I participated initially with some of contract negotiation. The change was not done by Sikorsky Aircraft, done by a company called American Electronics Lab Information in Farmingdale. None of the drawings, none of which what you see here was Sikorsky Aircraft, which we are out of it. It is not done at Sikorsky, nothing has to come back to them. It was done completely by the United States Navy Marine Corps.

Q. Now, would you resume your—I ask you be shown the group of documents I believe in the same volume you have before you. I would ask you to look at a photograph in there which is marked as Exhibit 38. And if Your Honor please, that is in the book of photographs which the jury has.

The Court: All right.

Q. Now, I observe in that what looks like a red flare cap, is that the same device?

A. Yes, it is.

Q. And that seems to be attached to a rectangular device. What is that?

A. The rectangular device is just a housing that is used to mount the button itself. It has a little switch underneath it.

Q. When this helicopter was initially supplied to the (p. 580) Navy, where did the collective, the side of the collective end?

A. If you look straight down you will see the fine edge. You will see a toggle switch. Well, there is another four-position between, and the toggle switch there, that to the left is the actual edge of the production collective. You will see a little piece of metal that flares out a little bit to the left and comes back to the red button. That was all mounted externally on the collective by the manufacture of the modified aircraft.

Q. Approximately when was that added to the aircraft?

A. It would be sometime after 1979 to 1980, sometime in there.

Q. From the photograph of this accident aircraft did you see that that part had been added?

A. Yes, it had.

Q. And does that part take up some of the space between the collective and the escape hatch?

A. Yes, it does.

Q. Can you make any estimate of how wide that is?

A. Approximately a half inch, three-eighths or half inch.

Q. How deep is the end where it goes back?

A. Oh, about an inch. In fact, I think that button is one inch diameter trim device. Might be smaller.

Q. As far as you know, from either while you were still (p. 581) at Patuxent River or in Sikorsky, was Sikorsky ever even consulted about whether that additional part could be added to the collective?

A. As far as I know, no.

Q. Have you had occasion to receive training in egress from the co-pilot's seat of the CH-53 D. Helicopter?

A. Yes, I have.

Q. Have you in fact gone through that kind of training?

A. Yes, I have.

Q. Have you gone through it with the collective in various locations?

A. Yes, I have.

Q. In any of these locations have you ever had any difficulty of any kind in reaching this escape hatch?

A. No, I haven't.

Q. And have you gone through that exercise both with the collective as supplied by Sikorsky and with the collective with the additional parts supplied by the New Jersey Corporation?

A. No, I haven't.

Q. Does that picture fairly represent the seat of a CH-53 D.?

A. Yes, it does.

Q. Did you do any background review of Lieutenant Boyle's records and the Jag Manual Report to determine what egress (p. 582) training had he received?

A. Yes, I did.

Q. What did you determine from that?

A. That he was in the initial entry aviator to the Marine Corps out of Naval Air Training Command, and he had received egress training there. And he probably received his last egress training there. His egress training as documented by the Jag Manual I think expired a couple of—

Mr. Franecke: I am sorry, Your Honor. I didn't catch the last part of that.

The Court: Repeat your answer.

A. According to the Jag, Judge Advocate General Investigation, the list that Major Koewn included there for qualification, emergency egress training was 14 months, and it is only a 12 month requirement by of Nav half 37 point point 7 kilo or point 7 series.

Q. Was there any evidence that he had ever had egress training in under-water escape from a CH-53 D.?

A. No, he hasn't.

Q. Are you familiar enough with the under water training which was in existence at about this time to know whether the Navy does train with emergency door — which must be opened under water?

A. No, they don't.

Q. Thank you, sir. No further questions.

(p. 583) CROSS-EXAMINATION

By Mr. Franecke:

Q. Mr. Carson, you now work for Sikorsky Aircraft, do you not?

A. Yes, I do.

Q. You worked for them since September of 1982?

A. Yes.

Q. With regard to this egress training that you were just discussing, the last question indicates that you have never had any training in getting out of a CH-53 window, co-pilot window while it is under water?

A. That is right.

Q. Why not?

A. There are no 53's they want to put in the water that would permit you to climb out without wasting a lot of government equipment.

Q. Have you ever tried to push a window the size of the co-pilot's escape window against water pressure to try to move it?

A. No.

Q. Wouldn't you expect it to be pretty darn difficult?

A. I wouldn't really want to make hasty judgement on that. You can't tell with water circulation, water coming in, movement of the aircraft, it could actually be drawn off. I wouldn't want to stipulate or specify unless I actually (p. 584) tried it.

Q. Drawn off by water pressure building up inside?

A. No, not necessarily. Water is a fluid like air, and if the vehicle is moving through the water, creates a low pressure, the window could pop out.

Q. In other words, this CH-53 acts like a submarine and moves along one—

A. It is sinking, moving down.

Q. I see.

Well, if it is sinking, water is coming in, is it not?

A. Yes.

Q. So how can it actually have less pressure on the outside than on the inside?

A. We are not talking about less on the outside, we are talking about a pressure, a loss of pressure. I don't want to pass judgment, I wasn't there to try it.

Q. You have never been in a an actual crash situation under water in a CH-53?

A. No, I haven't.

Q. Did you ever try to—so you really can't tell us what the co-pilot had to experience when that collective was full up in the crash situation in the murky water off Virginia Beach reaching for that escape handle?

A. No.

Mr. Booker: I object. No testimony that at that (p. 585) point the collective was full up.

Q. Objection, Your Honor. Captain Tussing said—

The Court: You don't need to repeat. The jury remembers what was said. That is their responsibility.

By Mr. Franecke:

Q. The answer to my previous question is no, you cannot, I am sorry?

A. Yes. No, I cannot.

Q. No, you cannot.

A. Excuse me, Your Honor. Could I get a sip of water?

The Court: Bring him a glass of water, if you will, please.

By Mr. Franecke:

Q. Mr. Carson, you were also asked with regard to that button on the collective on the left-hand side, that it was put on by the Navy, is that correct?

A. Contracted for by the U.S. Navy.

Q. Contracted for.

Were you involved in the evaluation of putting that button on the collective?

A. At that point, no, sir, I wasn't.

Involved in the actual installation of that device? I was involved on a couple other aircraft military requirements dictated that I be someplace else when that requirement came around.

(p. 586) Q. Isn't it foreseeable that certain modifications may be made by the U.S. Navy to its own aircraft?

A. Oh, yes.

Happens at lot.

Q. Did you check to see if Sikorsky was in fact consulted with regard to this modification?

A. In fact I know that Sikorsky was. They requested Sikorsky put a bid in to do the modification, and it was too costly for the U.S. Navy and that was the last time Sikorsky was contacted.

Q. So Sikorsky wanted too much money to put that button in?

A. Well, their button wouldn't go there. Our human factors people wouldn't permit that.

Q. I see.

Sikorsky was aware the button was going in. Did you see any documents in your review, either Sikorsky or the Navy, where Sikorsky said, no, don't put the button there because it might interfere with the escape system?

A. Let me back up one, Your Honor, If I may. I can't say for sure that Sikorsky was aware that button was ever put there. We don't necessarily participate, and I don't have a feel for what the people in out of production aircraft do. I can't myself state that Sikorsky did or did not know that that button was going on the aircraft.

(p. 587) Q. You don't know anything about what was going on, at Sikorsky?

A. No, you are right. I was in the U.S. Marine Corps at the time.

Q. All right.

You were not present when Captain Tussing testified here in court on Monday afternoon, were you?

A. No, I wasn't.

Q. So your whole knowledge with regard to what actually happened in the aircraft by the witnesses who were there was the testimony of Sargeant Tubbs, and the statements that are contained within the Jag investigative manual, is that correct?

A. Yes, sir.

Q. Did anybody make you aware, your attorney here since you are an employee he is your attorney, make you aware that Captain Tussing indicated that as he took over control of the aircraft he not only pulled up on collective and added power, but he also moved the stick gently over to the right to initiate a right-hand turn and that the stick continued to move over up against his leg?

A. I cannot say that I was specifically given that information.

Q. Sir, that would not create a violent eye shattering roll over, would it?

(p. 588) A. No, sir, but that is not a hard over.

Q. It is not a hard over, but it is in fact an uncontrolled input by the pilot, is it not?

A. Yes, it could be controlled input by the co-pilot.

Q. And the net result—excuse me, sir?

My question was, it was not a controlled input by the pilot, was it?

A. It was not.

Q. And in fact, the net result is the same, the stick is all the way over to the right, isn't it?

A. I don't know that.

Q. Well, let me ask you, sir, as an expert for Sikorsky to assume that the stick is now over to the right. You also reviewed the various witness statements in the Jag investigative manual of people who were outside the subject aircraft, did you not?

A. Yes.

Q. Do you recall reading First Lieutenant Marshal was flying in a helicopter observed this helicopter, saying it looked like a right wing over. Going over to the right?

A. Sir, may I—

Q. Excuse me, let me finish the question.

Mr. Matos said, they turned to the right on a nose down attitude. They maintained the angle of bank until they hit the water.

(p. 589) Mr. Trickett, Corporal Trickett who was actually in the aircraft said, very suddenly the aircraft went into a hard right.

And one further one.

First Lieutenant Turner also outside of the aircraft flying in another aircraft said, the aircraft rotated suddenly nose right and headed for the water.

Now, sir, isn't that consistent with the pilot stick going over and staying to the right?

A. It is not totally consistent, because all naval aviators are trained at the same place, and a wing over by definition is a nose up rolling right-hand turn back down, which is a normal maneuver for a 180 degree landing with a helicopter.

Q. Captain Tussing, of course, never testified to it.

A. There were two witnesses another witness said he saw the aircraft go nose up as well.

Q. Exactly nose up?

A. Prior to the roll.

Q. Prior to the roll. Captain Tussing testified that he had put in collective and raised the nose, because they were on a slight descent going in to the carrier, isn't that consistent?

A. Yes.

Q. Isn't it also true, sir, that you were testifying (p. 590) about the co-pilot having control and initiating a left-hand turn, is that correct? Well, sir, wouldn't that be a force that would assist the pilot to get out of the right-hand turn that obviously was resulting in a crash in the water?

A. Initially, no, sir. If the aircraft commander grabbed the controls and the co-pilot, like I said initially, you fly a CH-53 with your fingers, not your hand, you don't have your physical hand on the control.

The aircraft is hydraulic, there is very little force required to move, to be light on the controls and make the maneuver, so you do it with finger tips. So if the aircraft commander came on the controls, the co-pilot remained on the controls, it would be very easy to initially power, and I think that is indicative of the fact that the co-pilot made no mention, or made mention of the fact that he couldn't get left-hand control when there was no requirement for left-hand control. There was requirement to put it in right-hand control to make that right-hand turn.

Q. Sir, if Captain Tussing with his finger tips holds the stick and starts moving it to the right, and the parallel stick that Lieutenant Boyle has wishes it to go to the left, Captain Tussing would have described that the stick was

pulled out of his hand to the left, not to the right, isn't that true?

A. He did not—well, I did not see, did not listen to (p. 591) Major Tussing's statements today, but did the cyclic physically get pulled out of his hand or physically go right?

Q. Physically went to the right.

The Court: Did it go out of his hand?

Q. It continued to push against his hand over to the right.

A. But did not go out of his hand?

Q. That is correct, but it went to the right, not to the left.

A. Well, he was trying to turn right whether the co-pilot was trying to turn left, if he relinquished control the stick would have gone further to the right, it would have gone all the way to the stop.

Q. How is it their the co-pilot is going for a left-hand turn and the stick goes to the right?

You move the stick to the left to go to the left-hand turn.

A. I think—let me back up one here for semantics. Co-pilot is trying to turn left. He never did turn left because Major Tussing turned the aircraft to the turn and physically probably took the cyclic out of the co-pilot's hand when he did. All of a sudden there was a five pound or eight pounds force, whatever is required to overcome the co-pilot's hand, and at that point then the cyclic, when he

let's go the cyclic goes right. It would be like a bind in (p. 592) something and all of sudden the bind let's loose and then it will go to the stop.

Q. Why didn't, in your opinion why didn't Captain Tussing then simply with this finger tip control move it back to the proper position to continue in a smooth right-hand turn away from the carrier?

A. Could I have the model please? Maybe I can describe it.

Your Honor, may I stand up to get arm clearance here?

The Court: All right.

There you are.

A. I would like to describe the maneuver for you here. The aircraft is in a nose high attitude, probably eight or nine, ten degrees decelerating. He is at 40 knots or 45 or 55 knots is what I got out of the jag investigation.

At the point of the wave off maneuver, I didn't get this, this was not in the jag investigation, but you have stated that Major Tussing started aft on the cyclic to initiate the wave off while he was already slow. That aft cyclic slows the aircraft some more. As it does, normal trim control positions for the aircraft if you go through engineering plot of what happens, the cyclic moves aft and it moves left. There is a left requirement to Hoover because of the thrust from the tail rotor right here. It is pushing the aircraft. So as the left-hand requirement comes in, towards (p. 593) the bottom the stick is already back in his lap. The co-pilot is still on the controls, his

legs are up around it. You have got two inches of bias in the co-pilot's stick. That is 50 percent of what he has available over there, and you have got a co-pilot's leg filling everything else.

Things are all good, aren't they?

Q. Is it a chip?

A. No, it is an antenna, it is not a chip.

As the aircraft decelerates and he starts to roll right, as you start to roll right, normal stability says left-hand cyclic has got to be used just to stabilize it as well as roll it out. So as it starts down, he is going to—the next thing the aircraft does, if he does nothing but hold it up against the stop, the aircraft is going to roll down into or down and around. And at this point the best thing he could have done for recovery early would have been all the horse power in the world way up here. But as stated by both the crewmen in the back the horse power was pulled way late, and normal spool up time probably wouldn't prevent the aircraft to prevent it from mashing into the water. He was very close to recovering.

Q. He was too low, but I don't follow the explanation.

The Court: It is not a question of whether you follow.

Q. You are stating that the stick has to be just even, (p. 594) given your explanation, over to the left and back to come out of the maneuver that you have just described?

A. Yes.

Q. Now, did you see any indication that Captain Tussing as, A 12 hundred hour pilot in command of the same

aircraft had flown the aircraft for three and a half hours that previous morning?

A. Yes.

Q. And that he had made take offs and landings in that same aircraft, is that correct?

A. Yes.

Q. And that he was experienced in knowing how to come out of an approach and start a wave off turn to the right. Is that true?

A. Yes.

Q. Now, isn't it most probable then, sir, that the reason he did not initiate a smooth right-hand wave off was that something happened to his control system forcing the stick over to the right?

A. No, sir, I don't I think he backed himself in a corner of the flight envelope, and with the situation the way it was, he did not have enough control power to stop it.

I broke another one.

Q. One final question.

Mr. Carson. Would your opinion change at all if the (p. 595) pilot and Sargeant Tubbs both indicated that the co-pilot had acknowledged that the pilot in fact had control of the aircraft to initiate the wave off?

A. Yes, it would.

Q. And were you told that that in fact was the testimony?

A. No, sir, I wasn't.

Q. No further questions.

REDIRECT EXAMINATION

By Mr. Booker:

Q. Would your opinion change back if you were further told that it was after the co-pilot had acknowledged the wave off that he then said, I can't get enough left cyclic?

A. Yes, sir it would. That is in the jag investigation. That is really a foundation for the hypothesis that I have got here, is there was a period of time in between where both of them were hanging on the flight control.

* * *

(p. 597) Mr. Booker: On behalf of the defendant, United Technologies Corporation. We move the court to strike the—to direct a verdict on behalf of United Technologies Corporation on all of the issues in the case for the reasons stated at the conclusion of the plaintiff's case, and furthermore at this point with the defendant's evidence before the court and looking at the evidence not in the light most favorable to the plaintiff but whether the court can sustain a verdict for the plaintiff if one were returned, the (p. 598) evidence now establishes that the chip, whatever it might have done certainly did not cause this particular accident. And even so the question in this case is really not why the plane went in the water but why Lieutenant Boyle didn't get out of the aircraft.

The testimony and the photographs demonstrate clearly that there was ample space between the collective and

the window to reach the escape hatch knob. Further more, the evidence indicates that to the extent that space had been restricted, recently had been restricted by the Navy without any knowledge or input on the part of Sikorsky, Sikorsky certainly is not responsible for that. The test of the warranty case is whether the defect existed at the time the aircraft left Sikorsky.

And finally, the government contractor defense which we have raised is that the government knew as much as Sikorsky did about this, and it was the government itself which concluded there was ample space to put another device in there without any consultation with Sikorsky. So we say all the elements of the government contractor defense are made out and that the case should not go to the jury.

The Court: Your motion will be denied, but I am intrigued by your motion on his failure to use the escape hatch that was there for him. But an inference can be drawn that he by-passed that and he by-passed the one that his (p. 599) captain had used, and maybe he was going back to check on his crew members instead of doing—and it was a emergency situation. So that would be an inference that a jury could draw. So I can't say as a matter of law that he didn't do what was reasonable under the circumstances. But I will submit the case to the jury on some of the issues that the facts have revealed that need to be resolved by a jury.

Now, on the manufacture, other than the design, on the design characteristics of it, I am letting that go on the location of the collective stick and the handle for the emergency exit.

The other thing that I am really letting go to the jury is the re-manufacture of the servo and not the original manufacture. But according to the evidence, after there is a re-manufacture of that servo with the flushing, and the way that it is done, that would take out any prior chips that had been in there, so either it was inserted at that time or it could have come in down in Pensacola when the Navy's own rework in the second quarter, but those are factual things that need to be decided.

Basically so that you have a proper record, I am denying all of the substantive charges that were proposed by counsel, and you then preserve in your record for appellate purposes my actual denial of them. Is there anything that you feel I ought to add to the substantive charge that I have (p. 600) submitted here to make it a correct statement of the law? Or anything that I have over looked in it? Or is there anything in it that is a wrong statement of the law as you perceive it?

Mr. Franecke: Yes, there are certain matters, Your Honor. I guess we might as well take them up step by step.

In this particular part of the phase I would ask that Mr. Moore, both Mr. Moores and myself be allowed to address Your Honor since Mr. James Moore is our local counsel and he may be more familiar with the nuances of Virginia law.

The Court: All right.

Mr. Franecke: Your Honor, in page one and the first paragraph the question where it says—well, where it says that the second plaintiff's claim that defendant United

Technologies Corporation breached an implied warranty because of a design and/or a manufacturing defect.

The Court: Re-manufacture.

Mr. Franecke: Manufacturing defect. I thought the word that we had been using was repair rather than re-manufactured or both. And I submit that if we do—I believe that that would be a more accurate statement of what we were dealing with, repair or re-manufacture.

The Court: Okay. I have no problem with that. That is a matter—

Mr. Booker: If Your Honor please, it wasn't (p. 601) re-manufactured, it was overhauled. Overhaul is the word.

The Court: All right.

The Court: I will change it to that.

Mr. Franecke: I don't remember the word being used either. In the agreed state of facts I think what we—let's see what the agreed statement says.

Well, it says re-worked. So we are all wrong.

The Court: Re-worked.

Mr. Moore: Repair or rework.

Mr. Booker: There is a distinction between repair and rework, which Mr. Fox defined in his deposition. I think it is confusing to say that.

Mr. Franecke: Re-worked.

The Court: All right. Re-worked.

• • •

(p. 607) Mr. Franecke: This one at least we can fly manually.

We do get into an area where I believe that I should make a record with regard to the area of the government contractors defense.

The Court: All right.

Mr. Franecke: Plaintiffs have submitted several alternative instructions with regard to this area.

The Court: Okay.

Mr. Franecke: However, and specifically, I would like to address the individual parts of this particular proposed instruction or charge as follows:

(p. 608) In the first sentence, Your Honor is proposing to say in addition plaintiff cannot recover under either—under a claim of negligence or based on design defect if defendant, United Technologies Corporation, proves by a preponderance of the evidence, and then you list three items.

First of all, it is my understanding, and I believe the current state of the law in the Fourth Circuit as well as the various other circuits of the federal system, that the government contractor defense is not a total bar to any negligence if there is not an element of compulsion on the part of the defendant to force the, in this case Navy, to accept a particular item that may have been—I am sorry, let me strike that.

The element of compulsion must be the Navy who compels the defendant to produce a particular product in a certain way. And in essence taking the element of

negligence and the element of good design out of the defendant's hands in order to comply with a Navy requirement for whatever reason. There is some gray area in this and I will fully admit there are.

The Court: I haven't seen where the Fourth Circuit has spoken to it.

Mr. Franecke: The Ellis case, which I have cited, and I have a copy of the Ellis case, which is a District Court of Maryland. It is not complete.

The Court: Well, that is the Fourth Circuit.

(p. 609) Mr. Franecke: That is correct, but it is in the Fourth Circuit, Your Honor.

They have in fact spoken to this, and I would welcome any other authority that is later that would in fact indicate one way or another whether or not compulsion is or is not a requirement under the government contractor defense pertaining to negligence.

But if, as I represent, as I believe the Ellis case to be the highest and the latest authority in the Fourth Circuit, I would submit that that would be in fact binding on this court to conform at this time. And I have a copy of the Ellis case which I believe Mr. James Moore has here. I don't know whether it you has been reported or yet not. I have a copy from the—here it is—I have a copy of it. It is Civil Action Number N-82-1341 in United States District Court for the District of Maryland. Catherine Ellis v. Bell Helicopter, et al.

The Court: Proceed.

Mr. Booker, do you want to take a whack at—

Mr. Booker: In defense of this one, Your Honor?

The Court: Well, here again, go through it systematically and go back to page one.

Mr. Franecke: I am sorry, Your Honor, I wasn't finished.

The Court: I thought you were. Well, you took your (p. 610) seat. I assumed that.

Mr. Franecke: I didn't know whether Your Honor wished to look at the Ellis case.

The Court: I will read it later. You are saying that in addition to the three elements I have in there I have to either modify one of those three or add a fourth which would be an element of compulsion that you say will be the law in the Fourth Circuit.

Mr. Franecke: That is correct, Your Honor.

The Court: Okay.

Mr. Franecke: Further, Your Honor, that in item number 3 the following sentence as a part of item number 3, that therefore defendant did not need to warn the government of the dangers involved in the use of the equipment.

The leading case appears to discuss this particular matter is the Koutsoubos case, which is a Third Circuit case, I believe. It is cited in Third Circuit, Eastern District of Pennsylvania, 1982 and has been followed by the Mannheim case in the Third. The point is, the first three elements that you have listed appear to be what the majority of the various circuits seem to be coming to as far as the government contractors' defense is concerned. But the final statement would be a question of fact and a ques-

tion that is not included within the actual charge to the jury. Whether or not warnings or non warnings would be required is a question (p. 611) of whether or not the United States Navy had or did not have the hazardous knowledge associated with a particular product.

And that is where I have been reading the cases. As I say Koutsoubos and Mannheim and out in the 9th McCoy v. Rockwell are some of the other cases that are dealing with this area.

So I therefore submit that the charging that I would then not need to warn the government of the dangers would not be included within the three step criteria of the government contractor defense.

The Court: All right.

Mr. Franecke: And then I will state the rest of it.

Then the next paragraph—well, all right. I withdraw anything on the next paragraph.

The Court: All right.

Mr. Franecke: That is all I have to say as far as the government contractor defense. Actually then, also I believe with regard to the rest of the proposed charge. Yes, Your Honor.

The Court: Mr. Booker?

Mr. Booker: May it please the court, first, we object again to any charge to the jury on the ground that the motions to dismiss the case and to instruct the jury to return a verdict for the defendant should have been granted. But, turning to specific portions of it, we do think that (p. 612) throughout where it mentions manufac-

turing or re-manufacturing, if the chosen word is "re-work" or chosen word is "overhaul" use that.

The Court: I am substituting re-work in every instance, and I am not even going into overhaul. But re-work seemed to be the descriptive word that was used, and whatever re-work is you all can explain to the jury in your argument.

Mr. Booker: It appears in a number of places, not just on page one.

The Court: Right. I am going to police it up throughout.

Mr. Booker: Secondly, Your Honor, we object to giving any instruction on the sudden emergency. We think there isn't any evidence of a sudden emergency as that is used, because this is the kind of thing that these people are trained to go through all the time.

The Court: Which is a factual argument, though. To say he isn't supposed to get the lump and do things that he—that maybe lay people would do or less trained people.

Mr. Booker: I think this is not even—there is not even any evidence of a sudden emergency, so we object to giving any charge on sudden emergency.

On page three, Your Honor, it says it is—the court says it is up to you as the jury to determine whether the (p. 613) design contained—whether the helicopter contained a design—that would be a re-work.

Plaintiff cannot recover for a breach of warranty if David Boyle—I would say, Your Honor, if David Boyle or the United States Marine Corps misused, because there is certainly evidence here—

The Court: Which part is it of that?

Mr. Booker: At the bottom. Plaintiff cannot recover for a breach of warranty if David Boyle or the United States Marine Corps misused. And we would say that failure to give instruction in under-water evacuation from this type of aircraft certainly creates an argument we are entitled to make of a misuse.

The Court: I think you can make that argument, sure.

But I don't think that I need to reduce it to that factual detail to entitle you to make argument. No, I agree it is a perfectly permissible argument.

Mr. Booker: On page four, Your Honor, we believe the court has given a proper government defense instruction. I would point out, just to keep the record straight, that the Koutsoubos case was approved, and the logic somewhat changed on appeal by the Fourth Circuit back in the spring. By the Third, and the citation for that is 755 F. 2d 352. And I think that supports what this court has said here in the charge.

(p. 614) On page five, Your Honor, we object to numbered paragraph 2 in the charge on damages. I recognize—

The Court: You are absolutely right on that.

Mr. Booker: Beyond that, Your Honor, other than the overall objection to giving any charge, we have no objection.

The Court: But there was no direct evidence that he sent any allotment or anything or in anyway supported any beneficiary.

Mr. Booker: No evidence and no testimony.

The Court: You are absolutely correct on that.

Mr. Franecke: That is number two.

The Court: Two will be deleted, right.

* * *

(p. 672) The Court: Ladies and gentlemen, you have heard the evidence and the argument of counsel and it now becomes my duty to instruct you as to the law applicable to this case.

The law as I state it is the only law that you can apply.

You are not to single out any one portion of my instructions as being controlling, but you must consider the instructions as a whole.

Neither are you to be concerned about the wisdom of any rule of law stated by the court.

Regardless of any opinion you may have as to what the (p. 673) law ought to be, it would be a violation of your sworn duty to base a verdict upon any other view of the law than that that I give you.

As I told you in the beginning, you are many judges in that you are the trier of the facts, and you have the sole and exclusive responsibility to make a collective determination of the facts that were in dispute. After you make that determination then you must apply the law as I now state it to those facts.

Nothing that I say in these instructions is to be interpreted as reflecting any view that I have about the case or who should be the prevailing party.

My instructions will be comprehensive and they will cover all phases of the case. And that is necessary in order for you to have guidance on the entire law that applies to a case such as this.

You have been chosen and sworn as jurors to try the issues of fact presented by the allegations of the complaint of Delbert Boyle as the personal representative of his son, David A. Boyle and the answer to that complaint filed by U. T. C.

You are to perform this duty without bias or prejudice to any party. Our system of law does not permit jurors to be governed by sympathy, prejudice, or public opinion. Both the parties and the public expect that you will carefully and (p. 674) impartially consider all of the evidence in the case, follow the law as stated by the court, and reach a just verdict regardless of the consequences.

One of the parties in this case is, as I told you earlier, is a corporation, and the other is an individual citizen.

The law makes no distinction between parties when they come to trial, and both parties are entitled to be treated fairly.

During the course of the trial there have been different forms of evidence. You have heard the live testimony of witnesses who were sworn and appeared before you in proper person. You have seen exhibits, you have heard stipulations and depositions read, and you are to consider all of these as proper evidence. In addition, you can consider inferences from the evidence, which is called circumstantial evidence. You bring to the jury box the accumulated experiences that all of you have had in life. The

system allows you to use your common sense when resolving issues that are before you.

During the course of the trial the lawyers, as I told you they would properly do, objected to the admissibility of certain evidence or to the form of questions. When I sustained one of those objections you must disregard the question altogether, and particularly if it encompassed a (p. 675) bunch of facts in the question and any answer that the witness may have given to the question before I could rule on the objection. If I ordered anything stricken from record, that must be disregarded altogether.

As I told you earlier, and I repeat, you are not to draw any inferences from any rulings that I made in the case, because I do not favor one side over the other. I am totally impartial and leave entirely up to you the ultimate decision in the case.

You as jurors are the sole judges of the credibility of the witnesses and the weight their testimony deserves.

You may be guided by the appearance and conduct of a witness, by the manner in which a witness testifies, by the character of the testimony given or by evidence that contradicts the testimony given. You should carefully scrutinize all the testimony given, the circumstance under which each witness has testified, and every matter in evidence which tends to show whether a witness is worthy of belief.

Consider each witness's intelligence, motive, state of mind, demeanor, and manner while on the stand.

Consider also any relation each witness may bear to either side of the case, the manner in which each witness

might be affected by the verdict, and the extent to which, if any, each witness is either supported or contradicted by (p. 676) other evidence in the case.

You may also take into consideration any prior inconsistent statements made by a witness if that has been proven by the evidence.

There also, ladies and gentlemen, were a great number of experts, experts who testified in the case. Now, I told you that in addition to factual testimony that some of them gave as an underlining predicate for the opinions, that their opinions become evidence in the case which you must consider, and in determining the weight to be given to the testimony of an expert witness you should consider the basis of his opinion, the manner by which he arrived at it, the extent of his education, and the impressions that he made on you as to whether he was a knowledgeable person or whether he was not. Now, here again, an expert can become an expert by education, training, or experience, but once I rule someone is an expert then you must consider his testimony, because it is up to me to make a determination as to whether he qualifies as an expert.

Now, you will recall that some of the experts said that they relied in formulating their opinion on certain things that the lawyers made available to them. This is the customary way it is done. But the expert's opinion can be no more reliable than the quality of the information that is provided when formulating those opinions. Consider this when (p. 677) determining what weight you give to the testimony of any of the experts that testified. Now, bear in mind, ladies and gentlemen, that a great deal of reliance was placed upon the jag study that was ordered by the Navy.

Now, I have excluded certain portions of that because I didn't think that it was sufficient to—sufficiently reliable for you to have as evidence in the case, but a great deal of the expert testimony was based upon information contained in that report. And it will be available to you as an exhibit and you may consider it for the limited purpose of deciding whether the facts contained in that that the expert based his opinion were sufficiently reliable for you to feel comfortable with his opinion and give weight to it.

Now, in determining the weight of the evidence, it isn't a numbers game at all, but one witness in whom you have confidence can provide sufficient testimony to make out a preponderance of the evidence. And I will go into that later on.

If you believe that a party without explanation failed to call an available witness who has knowledge of necessary and material facts in this case, you may presume that if called that witness's testimony would have been unfavorable to the party who failed to call him.

The non appearing witness must have not been equally available to the opposing side.

(p. 678) Further more, one issue in this case involves a piece of wire found in the helicopter's AFCS servo after the accident. Neither of the parties involved in this case is responsible for the fact that it was not presented to you as evidence. The piece of wire was lost or destroyed by the United States Navy prior to this litigation.

Now, ladies and gentlemen, I also want to comment upon the fact that there are a great many gaps in the evidence in this case, because the salvage crew that went out to retrieve the helicopter once it sunk into the ocean obvi-

ously had to hook devices onto the helicopter to make it surface and then load it onto a barge, and then transship it into the Norfolk Navy yard or wherever they transshipped it before they loaded it on a box car. We don't know whether any molestation of anything occurred during that transfer or not. Whether the cables broke out anything as they were, hitting it, but apparently no one knew who those people were and it wasn't because the parties didn't want to bring them in here, because they were just incapable of providing you with that information.

The more desirable way, of course, in a case such as this is to have every piece of evidence that could be available at all that would shed light on issues for the jury. But we can't control these things sometimes. And including the one person that the Navy apparently (p. 679) commissioned to be the head honcho on investigating this was precluded by the Navy from even appearing here. So we did not receive the guidance that he may have given us.

From time to time during their closing arguments the lawyers alluded what they thought the law in the case would be, and they also recited their recollection of factual testimony that I permitted to come into evidence. You as jurors must disregard their statement as to what the law is if it differs in any way from what I tell you.

And if their recollection of the factual testimony that came into evidence differs from your own, disregard their recollection of the facts and make your own determination.

I have a right under our system to comment on the evidence, and I may do so, but if in trying to do so my own efforts to recall it differs from yours, you disregard what I say altogether and make your own determination.

But the ultimate decision in the case must be the collective recollection of the jurors.

Now, I have directed you to take notes in the beginning simply so you could more intelligently follow the case, particularly on chronology and that sort of thing. And when you go back to your room you will have your individual notebooks. Now, you are to use those in refreshing your own recollection and not try to lobby and propagandize some other (p. 680) juror by telling him that you are a whole lot smarter than they are because you wrote it down and they didn't. But some people have better recollections just from hearing things than others, and others depend upon notes. But you use them just as an aid and a guide to help you be an active participant in the deliberative process.

Now, ladies and gentlemen, the lawyers suggested that there was a burden in the case by the plaintiff to prove certain things by a preponderance of the evidence, and that is so. A preponderance of the evidence is a legal term and it simply means the greater weight of the evidence. The burden of proving things by a preponderance of the evidence shifts some in the case and I will give you more detailed instructions on that when I get to the specific theories of the case that have been advanced by the parties here.

In this case the plaintiff asserts two different theories of liability. First, he claims that the defendant, U. T. C., was negligent in the design and/or the re-work of the helicopter involved in the accident.

Now, you will recall that the re-work was when the servo was shipped back to U. T. C. for whatever it did to it in the first quarter of 1982. There has been extensive evi-

dence on that. You will have quite a few exhibits that will speak to that.

Second, the plaintiff claims that the defendant, U. (p. 681) T. C. breached an implied warranty because of a design and/or a re-work defect. The plaintiff can collect damages if he proves either or both of these claims.

Now, I will discuss those in turn.

In order to find your verdict for the plaintiff on a theory of negligence the plaintiff must prove by a preponderance of the evidence two things. One, that the defendant was negligent, and two, that the defendant's negligence was the proximate cause of the accident and David Boyle's death.

Negligence is the failure to use ordinary care. Ordinary care is the care a reasonable person would have used under the circumstances of this case.

A proximate cause of an accident, injury or damage is a cause which in natural and continuous sequence produces the accident, injury or damage.

It is a cause—it is cause without which the accident, injury or damage would not have occurred. If there is an intervening cause which is an independent event not reasonably foreseeable that completely breaks the connection between the defendant's negligent act and the accident, then the defendant's act was not a proximate cause of the plaintiff's injury to the slightest degree.

In this case the plaintiff claims the defendant was negligent in its design of the co-pilot's egress system and/ (p. 682) or the re-working of the Moog valve of the AFCS

servo and that one or both of these negligent acts was the proximate cause of the death of David Boyle.

The mere fact that the helicopter entered into the water is not evidence of a negligent act by the defendant. However, a manufacturer has a duty to use ordinary care to design and re-work a product that will be reasonably safe for its intended purpose or for some other reasonably foreseeable purpose.

If a manufacturer fails to perform this duty, then it is negligent.

The defendant, U. T. C., asserts that David Boyle was guilty of contributory negligence, and therefore the plaintiff cannot collect damages for his death.

It is the defendant's burden to prove by a preponderance of the evidence that David Boyle was contributorily negligent and that his negligence was a proximate cause, contributing cause of his death. Contributory negligence is the failure to act as a reasonable person would have acted for his own safety under the circumstances of this case.

If you find from the greater weight of the evidence that both David Boyle and defendant, U. T. C., were negligent and that their negligence proximately contributed to the accident, you may not compare the degree of negligence of the (p. 683) parties. Any negligence of David Boyle which was a proximate contributing cause of the accident will bar the plaintiff from recovery under his negligence claims.

The plaintiff contends that David Boyle was confronted with a sudden emergency. A sudden emergency is an event or a combination of circumstances that calls for immediate action without giving time for the deliberate

exercise of judgment. If you believe from the evidence that David Boyle without negligence on his part was confronted with a sudden emergency and acted as a reasonable person would have acted under the circumstances of this case, he was not contributorily negligent.

Plaintiff's second theory of liability rests on a breach of warranty. A warranty is a promise or guarantee by a manufacturer or a seller that its product is of a certain quality or character. In this case plaintiff claims that defendant, U. T. C., breached an implied warranty. By law there is an implied warranty by a manufacturer or seller that its product will be fit for the purposes for which it is ordinarily used. This is called an implied warranty of merchantability. In order to recover for a breach of this warranty the plaintiff must prove by a preponderance of the evidence three things. One, that one or both of the parts of the helicopter at issue in this case as designed and/or re-worked by the defendant was unreasonably dangerous either (p. 684) for the use to which it was ordinarily put or for some other reasonably foreseeable purpose. Two, that the unreasonably dangerous condition existed when the helicopter left the defendant's hands. And now bear in mind that the egress window on the co-pilot's side left the manufacturer's hands in July of 1970 when it was delivered to the Navy, and the re-work of the servo left the manufacturer's hands in the first quarter of 1982. There was no—so keep those two dates in mind. And while I use the word "helicopter" in a generic sense, this case really narrows down to the two parts that you have heard all the testimony about.

The third item is that the unreasonably dangerous condition proximately caused David Boyle's death. A product

such as a helicopter can be unreasonably dangerous if there is a defect in its design or re-work. In this case plaintiff claims defendant, U.T.C., breached the implied warranty of merchantability by a design defect in the co-pilot's egress system and/or by a defect in the re-working of the AFCS servo. It is up to you as the jury to determine whether the helicopter contained a design or re-work defect.

Plaintiff cannot recover for a breach of warranty if David Boyle misused the helicopter egress system or the AFCS servo, or used either one in a way not reasonably foreseeable by the defendant.

It is the defendant's burden to prove David Boyle's (p. 685) misuse by a preponderance of the evidence.

In addition, the plaintiff cannot recover under either a theory of negligence or breach of implied warranty based upon a design defect if defendant, U.T.C., proves by a preponderance of the evidence these three things. One, that the United States Navy established or approved the specifications for the co-pilot egress system; two, that the helicopter conformed to these specifications; and three, that the United States Navy knew as much or more than the defendant about the helicopter's hazards and therefore defendant did not need to warn the government of the dangers involved in the use of the equipment.

It is not necessary for the defendant, U.T.C., to prove that the government established every exact detail of the egress system. However, the defendant must prove by a preponderance of the evidence that the United States Navy specifications were more than just general requirements or that the Navy examined or agreed to a detailed description of the system.

If you find your verdict for the plaintiff, either because of the defendant was negligent or breached its implied warranty of merchantability, then you must reach the issue of damages.

You may consider, but are not limited to, any of the following which you believe by a preponderance of the (p. 686) evidence were caused by the defendant's negligence or a breach and therefore are damages suffered by David Boyle's beneficiaries.

One, any mental anguish and loss of solace suffered by the beneficiaries. Solace may include society, companionship, comfort, guidance, kindly offices, and advice of the decedent. Two, any reasonable expected loss of services, protection, care, and assistance which the decedent provided to the beneficiaries.

If you award damages you must distribute those damages among David Boyle's beneficiaries. They are his parents and three sisters. Your verdict should be for such sum as willfully and fairly compensate the beneficiaries for the damages sustained.

The burden is on the plaintiff to prove by a preponderance of the evidence each item of damages he claims and to prove each item of damage was caused by the defendant's negligence or a breach of warranty.

He is not required to prove the exact amount of damages, but he must show sufficient facts and circumstances that will permit you to make a reasonable estimate of damages in arriving at your award.

In addition, when determining an award of damages you can consider that a life expectancy table shows that

David Boyle had a life expectancy of 43 point 6 years at the time (p. 687) of his death on April 27, 1983.

This is evidence you can consider, but it is not absolutely binding on you. You can decide that his life expectancy may have been longer or shorter, but that is left entirely up to you.

Now, ladies and gentlemen, that basically concludes my substantive charge, but let me give you further guidance. First order of business when you go back to the jury room is to select a foreperson. It is that individual's responsibility to preside over the deliberations and to see that each juror has a full and complete opportunity to express his or her views about the case. It is a reasoning process, and there may be a majority of you who think one way and a majority on the other, but you ought to listen to each other and reason together and then reach a collective decision. From time to time during the course of your deliberations you may need to communicate with the court. If you do, there will be a marshal sitting outside of the jury room. Knock on the door, he will come in, and write out any question that you have for me and have the foreperson sign it. If it is a matter that I can assist you with, I will bring you back in and give you further guidance. But I am precluded by law from going into certain things at this stage of the proceedings, and if it is one of those, I will tell you so and just return you to your deliberations.

(p. 688) After you reach a verdict then you will have verdict forms in the courtroom. If you find your verdict for the plaintiff, you make an award of damages, but you have to apportion that award, if you make one, among the five beneficiaries. That verdict has to be signed by your foreman, foreperson.

If you find your verdict for the defendant, you just say, we, the jury, on the issues joined find our verdict for the defendant, and say no more. And that has to be signed by your foreperson and dated.

I will send the verdict forms back into the room with you. I will have the lawyers call through all of the exhibits, because we with have withdrawn a great many of them. Even though some of them were alluded to, they won't be back in your room. I want you to rejoice at that fact because it is less raw material that you have to sift in reaching your verdict.

But the lawyers have done a very commendable job in this case, and eventhough I told you in the beginning that I tried to make them be efficient and present cases in an expeditious fashion, they each knew their subject matter vary well, and it is always a pleasure for me as a presiding judge to be involved in a case where lawyers take charge and do what they are supposed to do.

* * *

(p. 691) (Out of the presence of the court)

Mr. Booker: Defendant, United Technologies Corporation, objects to the exclusion—objects to the admission of plaintiff's exhibit 11, the quality control audit message from Pensacola, on the grounds of irrelevance and hearsay.

In addition, defendant objects to the refusal of the court to exclude the following portions of depositions from the jury. From the deposition of Mr. Terry Fox, page 30 line 16 through page 31 line 7.

Page 32 line 5 through page 33 line 16.

And page 46 line 8 through 47 line 13.

The defendant had objected to inclusion of those on (p. 692) the grounds of irrelevance and hearsay and the court overruled the defendant's objection.

In addition, defendant objects to the introduction of page 20 lines 9 through 11 and page 25 line 1 through page 28 line 4 of the deposition of Jerry Clemons on the grounds of irrelevance and hearsay.

That is it.

Mr. Franecke: So be it.

(After recess at 5:11)

(Jury in the box at 5:12).

The Court: Ladies and gentlemen, I have your question. I will read it for record. "In case we make decision for the plaintiff—it is a three-part question—A. What is the total amount requested? You just sue for an amount that is in excess of the jurisdictional requirements and there is no cap on what they sued for. So here again, we leave the question of damages entirely up to a jury.

Your second part is, do we have a limit? And the answer to that is, no, it is entirely a matter for you to decide. And do you have any monetary guidelines? And the answer again is no, neither a court nor the lawyers can in any way help you out in making this decision. And I will remind you that I believe in his closing argument Mr. Franecke did mention a sum, but that is in no way is evidence in the case nor is it in any way binding or a guideline for (p. 693) you. But the question of damages is left entirely up to the jury. Return to your room and resume your deliberations. Everyone remain seated while they depart.

(Jury out at 5:13.)

The Court: Any objections that you have, Mr. Franecke, to what the court just said to the jury? I suggest that you put them on the record.

Mr. Franecke: I have no objection, Your Honor.

The Court: Mr. Booker?

Mr. Booker: No objection, Your Honor.

The Court: All right. Fine. This will become a part of the record.

* * *

(p. 694) (Jury in the box at 5:30)

The Clerk: Mr. Foreperson, has the jury agreed on a unanimous verdict?

The Foreperson: Yes, it has.

The Clerk: Verdict, we the jury find in favor of the plaintiff, Delbert Boyle, personal representative of the heirs and estate of David A. Boyle, deceased, and assess his damages in the sum of \$725,000. This amount shall be distributed as follows: Delbert Boyle, father of David A. Boyle, \$250,000.

Willma Boyle, mother of David A. Boyle, \$250,000.

Karen Lynn Boyle, sister of David A. Boyle, \$75,000.

Janice Boyle Freetag, sister of David A. Boyle, \$75,000.

And Terry Lynn Boyle, sister of David A. Boyle, \$75,000.

Signed, Louis P. Holt, Jr., Foreperson, date July 24, 1985.

Jurors, is this your verdict?

The Jury: Yes, it is.

* * *

(p. 695) The Court: Judgment will be entered on the verdict. I want to thank counsel for the cooperation that you extended to the court in handling the matter as expeditiously as you did. There were a lot of witnesses and exhibits. Had it not been for the fact that able lawyers were handling the case it could have drug on forever. Adjourn until tomorrow at 10:00 o'clock.

* * *

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
RICHMOND DIVISION

DELBERT BOYLE, ETC.,

Plaintiff,

v.

CA-84-0486-R

UNITED TECHNOLOGIES
CORPORATION,

Defendant.

September 10, 1985

Richmond, Virginia

Before: HONORABLE ROBERT R. MERHIGE, JR.,
United States District Judge

Appearances:

JAMES E. MOORE, ESQ.
LOUIS S. FRANECKE, ESQ.
For the plaintiff

LEWIS T. BOOKER, ESQ.
For the defendant

* * *

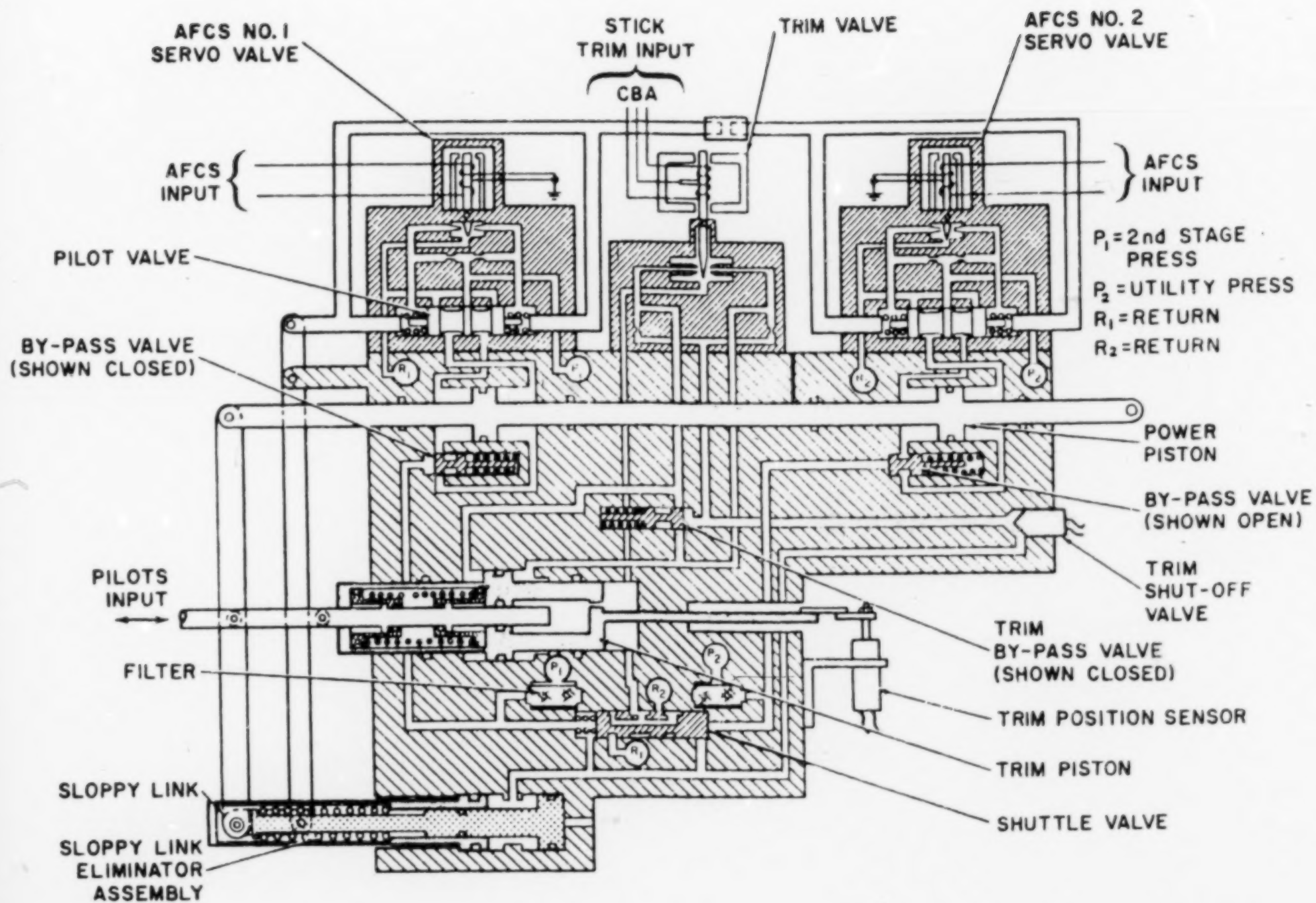
(p. 43) The Defendant's Rule 50 B. Motion for judgment notwithstanding the verdict and its Rule 59 A. Motion for a new trial are both denied. This case is peculiar in the sense that after the casualty occurred the agency of the armed services immediately involves itself in investigating what did occur and then brings vendor representatives to participate and oversee the investigation and that was done in this case. But a lot of the investigative material is not made available to a litigant who ultimately decides to challenge the vendor's product. That certainly was the case here. But given that disadvantage to both parties, there was substantial factual and expert

testimony presented that seemed to me to present issues of fact to be resolved by a jury on causation and things of that nature, and those issues were submitted to the jury on proper instructions that the court framed during the course of the trial, and the jury returned a verdict in favor of the plaintiff. So given the disadvantages of presenting a trial of this nature to a jury, I can only conclude it was done about as fairly as you can do in a case of this nature, and there is nothing about the verdict that appears to me not to have been supported by (p. 44) evidence that a jury, if it was of a mind to do so, could accept. I am aware of the criteria that the Fourth Circuit has established in the Wayland case and its predecessors. I am also aware that the Fourth Circuit has said that a District Judge follows a commendable practice when he denies a motion for a directed verdict during a trial and then gives relief on a N. O. V. or a Rule 59 A. motion. But in this case the evidence hasn't changed. As far as I am concerned, it was sufficient to justify sending the case to the jury, and I therefore see no basis for giving the defendant the relief that is requested here today.

I previously spoke about the issue of excessiveness, and that is in the record so I will make no further ruling on that.

* * *

PLAINTIFF'S EXHIBIT 1



[SEAL] PLAINTIFF'S EXHIBIT 11
DEPARTMENT OF THE NAVY
Naval Air Rework Facility
Building 52
Naval Air Station
Pensacola, Florida 32508

27 MAR 1985

Mr. Louis S. Franecke
Mack, Hazlewood, Franecke and Tinney
221 Pine Street, Suite 500
San Francisco, California 94104

Re: Boyle vs UTS, Reply Code 5800, Code 300

Dear Mr. Franecke:

In reply to your request for information concerning
CH-53D BUNO 157151, a copy of the Quality Audit is at-
tached as enclosure (1).

* * *

Sincerely,

/s/ B. T. DeAnn
for J. G. RUFF
Chief Engineer
NAVAIR Engineering Support Office
By direction of the
Commanding Officer

Encl:

(1) Quality Audit message NAVAIREWORKFAC
Pensacola FL 201815Z Jun 83

* * *

E. Most probable cause of flt cont problem prior to im-
pact was metallic contamination of AFCS Servo Valve.

* * *

E, QI was conducted by this activity reviewing quality assurance procedures, hydraulic contamination control program, production certification, documentation, RWK procedures and Artisan's training/qualifications. QI findings were:

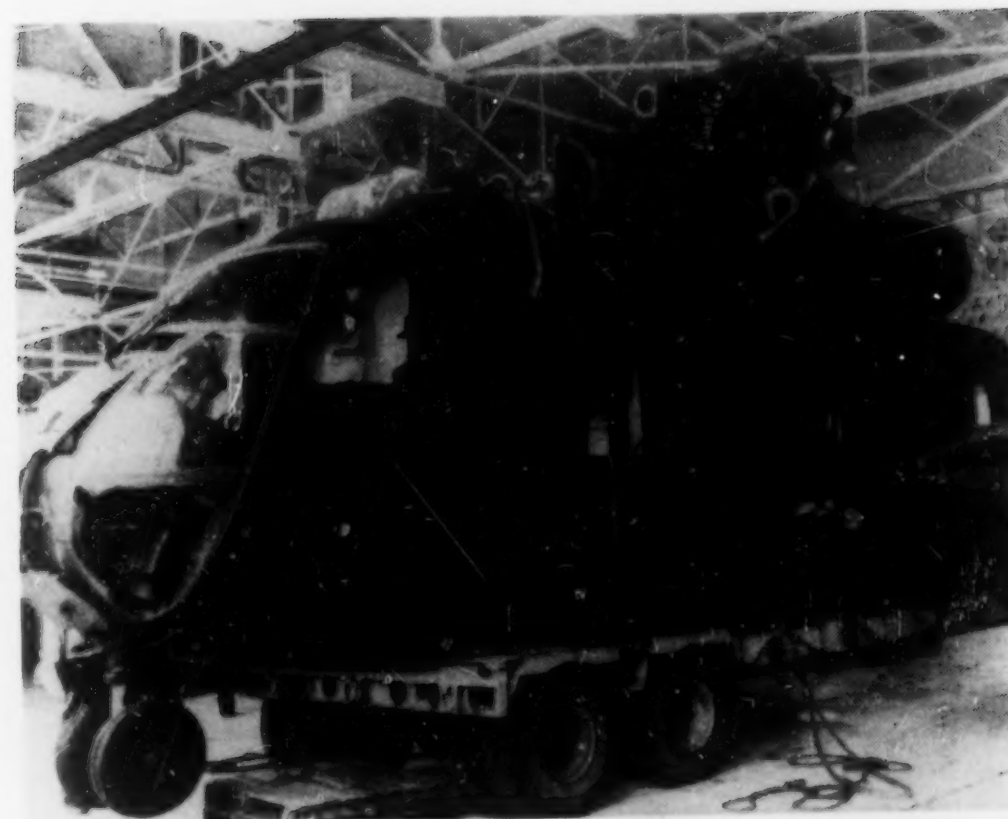
* * *

D. Wipe type and size RPTD by Ref D not used in RWK shop.

* * *

Based on the results of our QI, entry of contamination at this activity is so unlikely as to be considered a remote isolated incident of undetermined origin. POC N. L. Sherblo,

PLAINTIFF'S EXHIBIT 2



PLAINTIFF'S EXHIBIT 3

JOINT MESSAGE FORM

* * *

231823Z MAY 83

* * *

FROM: Navaireworkfac Pensacola FL

TO: HMM Four Six One
Comnavairsyscom Washington DC
AIG Four Two Three

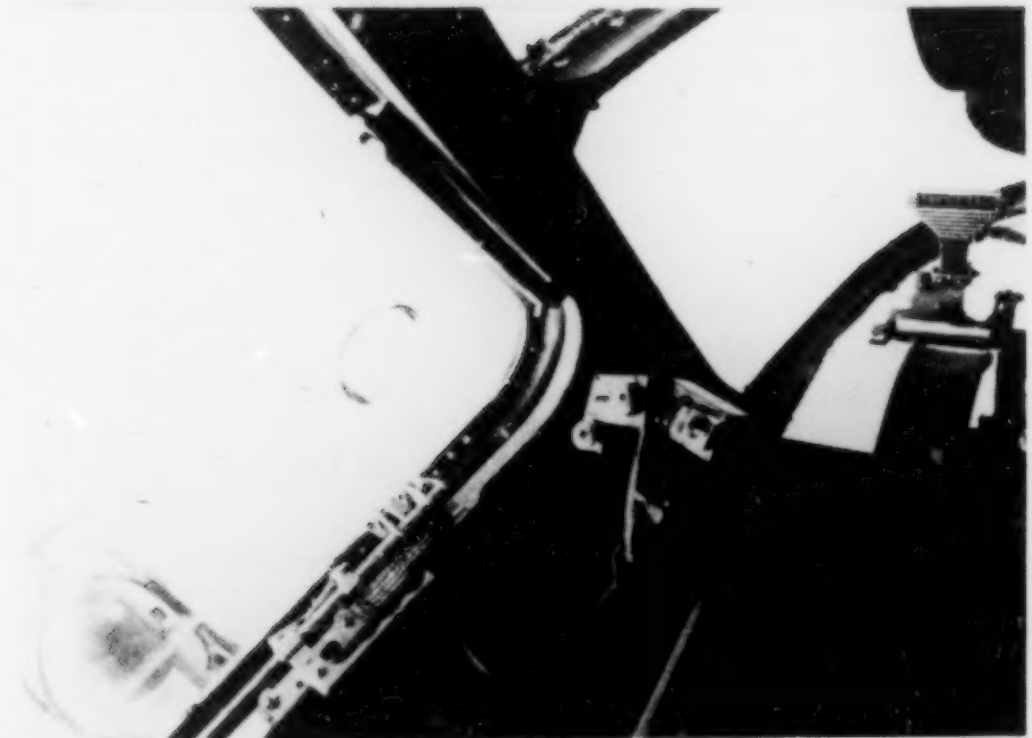
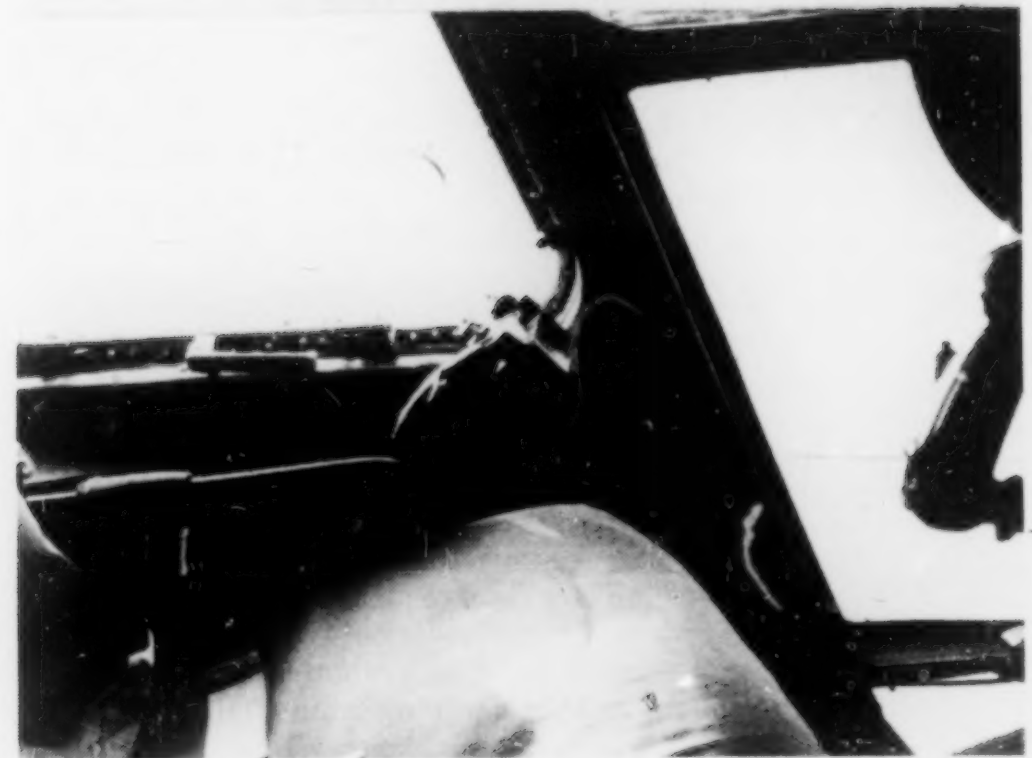
* * *

Subj: H-53 ACFT, Final EI Report OPNAV 4790-6
[Min: ETAUTH]

* * *

AE. Most probable cause of Flight Control problem encountered prior to impact is metallic contamination found in roll AFCS Servo Valve.

PLAINTIFF'S EXHIBIT 7



PLAINTIFF'S EXHIBIT 9

UNITED
TECHNOLOGIES
SIKORSKI
AIRCRAFT

Internal Correspondence

To: K. Wallischeck

Fm: D. Small

Re: Tests of a FOD Contaminated CH-53A AFCS Roll
Servo Cylinder

Dt: 1 July 1983

* * *

1. The test servocylinder, S/N B142-00008, was tested with a blocked SAS servo valve and with a metallic FOD insertion, as required by References (a) and (b), to determine servovalve load, deflection, and spring rate when the valve spool was blocked. A second test was performed to evaluate the ability of the servo valve to shear soft metallic FOD.

* * *

1. General.

To establish the Chip-Shear characteristics of a dual input servo valve mounted on an H-53 AFCS servo tests were performed. The data obtained can be used on any generic H-53 model with only minor adjustment due to small variations in control system linkage gains.

* * *

2.4 Servo Data

* * *

Force at Stick to React Hardover	45 lbs
Force to move against Hard Over	55 lbs

* * *

PLAINTIFF'S EXHIBIT 20

SIKORSKY AIRCRAFT Division of United Aircraft
Corporation

U
A

* * *

THIS DOCUMENT IS THE PROPERTY OF UNITED
AIRCRAFT CORPORATION

* * *

TITLE: AUTOMATIC FLIGHT CONTROL SYSTEM
(AFCS), DETAIL SPECIFICATION FOR
SUBMITTED UNDER:

Report No.	Date	Model	Contract No.
SER-65010	4/30/63	CH-53A	NOw 63-0150f

* * *

SIKORSKY AIRCRAFT Division of United Aircraft
Corporation

U
A

Page No. 1
Report No. SFR-65010
Model CH-53A
Date: 10-6-66

* * *

- 1.1 *Scope* — This specification establishes the limits of performance for the CH-53A Automatic Flight Control System (AFCS) under standard and environmental conditions.

* * *

SIKORSKY AIRCRAFT Division of United Aircraft Corporation

U

A

Report No. ACF-65010
Model CH-53A
Rev. No. R3
Date: 10-6-66

* * *

3.3.1.6 *Override Provision* — All of the channels of the AFCS have differential inputs and may be overridden by the pilot without disengagement of the system or damage to the system regardless of the signal levels in the controls.

* * *

3.3.1.6.1 *Override Forces* — The override forces shall not exceed the following values in the worst malfunction of the AFCS:

<i>Channel</i>	<i>Maximum Override Force</i>
Collective	8 lbs at the collective pitch stick grip
Yaw	30 lbs at the yaw pedals

8

PAGE NO.

PLAINTIFF'S EXHIBIT 72

NAVAIR 01-230HMA-1

NATOPS FLIGHT MANUAL

NAVY MODEL

CH-53 A/D

HELICOPTERS

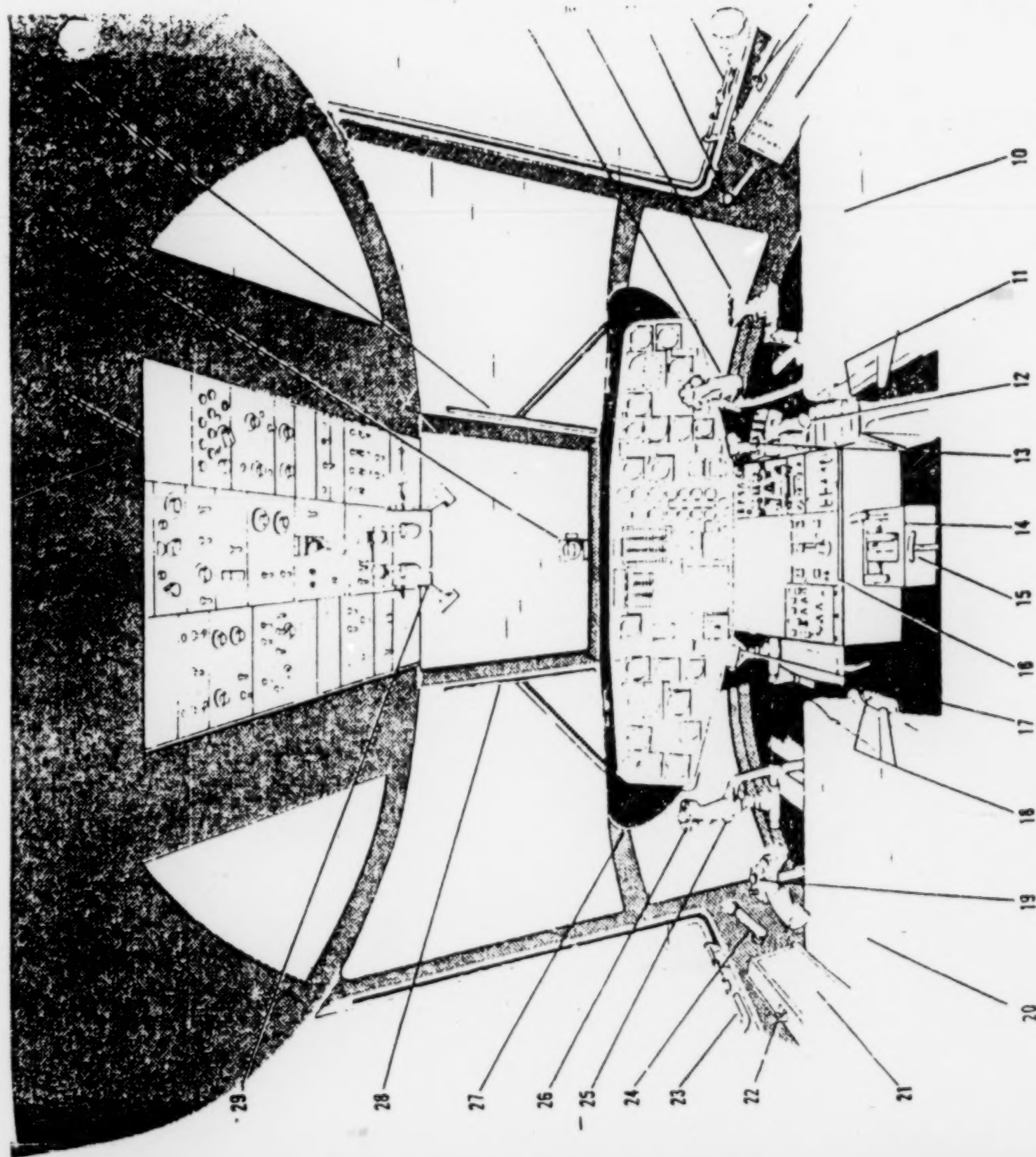
This publication is required for official use or for administrative or operational purposes only. Distribution is limited to U.S. Government agencies.

* * *

Issued By Authority Of The Chief Of Naval Operations
And Under The Direction Of The Commander,
Naval Air Systems Command

1 JUNE 1981

* * *



1. OVERHEAD CONTROL PANEL (SEE FO 2)
2. MAGNETIC STANDBY COMPASS
3. PILOT'S WINDSHIELD WIPER
4. PILOT'S CYCLIC STICK
5. PILOT'S ROTARY RUDDER PEDALS
6. PILOT'S WINDOW EMERGENCY RELEASE HANDLE
7. PILOT'S WINDOW RELEASE HANDLE
8. PILOT'S ROTARY RUDDER PEDAL ADJUSTMENT SWITCH
9. PILOT'S CIRCUIT BREAKER PANEL
10. PILOT'S SEAT
11. SHOULDER HARNESS LOCK LEVER
12. PILOT'S COLLECTIVE PITCH LEVER
13. PILOT'S ASHTRAY
14. LANDING GEAR CONTROL PANEL
15. CARGO HOOK EMERGENCY RELEASE HANDLE

16. CENTER COCKPIT CONSOLE (SEE FO-3)
17. COPILOT'S ASHTRAY
18. SEAT ADJUSTMENT LEVER
19. COPILOT'S COLLECTIVE PITCH LEVER
20. COPILOT'S SEAT
21. COPILOT'S CIRCUIT BREAKER PANEL
22. COPILOT'S ROTARY RUDDER PEDAL ADJUSTMENT SWITCH
23. COPILOT'S WINDOW RELEASE HANDLE
24. COPILOT'S WINDOW EMERGENCY RELEASE HANDLE
25. COPILOT'S ROTARY RUDDER PEDALS
26. COPILOT'S CYCLIC STICK
27. INSTRUMENT PANEL (SEE FO-1)
28. COPILOT'S WINDSHIELD WIPER
29. ENGINE CONTROL QUADRANT (SEE FIGURE 1-12)

Figure 1-5 Pilot's Compartment (Typical)

Figure 1-6 deleted

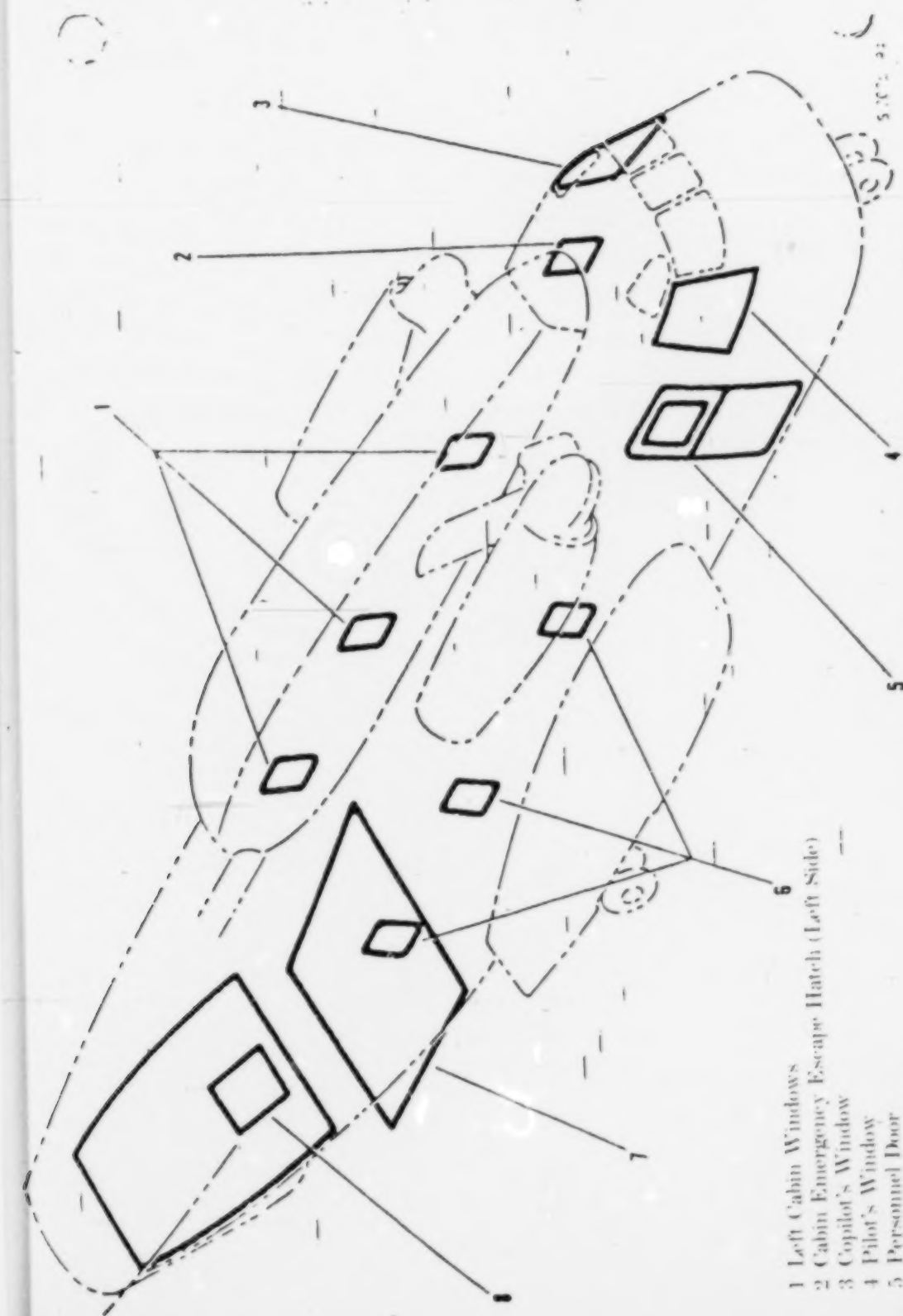


Figure 1-28. Emergency Exits and Entrance Doors

- 1 Left Cabin Windows
- 2 Cabin Emergency Escape Hatch (Left Side)
- 3 Copilot's Window
- 4 Pilot's Window
- 5 Personnel Door
- 6 Right Cabin Windows
- 7 Rear Cargo Ramp
- 8 Rear Cargo Ramp Door Window

EMERGENCY EXITS AND ENTRANCE DOORS.

Pilots' Compartment Windows.

* * *

The windows may be jettisoned to provide emergency exits by the manual emergency release handles (6 and 24 ... figure 1-5) marked **EMERGENCY EXIT PULL OUT AND TURN**, located at the bottom of each window inside the pilot's compartment. The windows can be jettisoned by pulling the release handle and pushing out on the window. The windows can also be released from the outside by turning the handle, marked **EXIT RELEASE — PRESS BUTTON — TURN**.

* * *

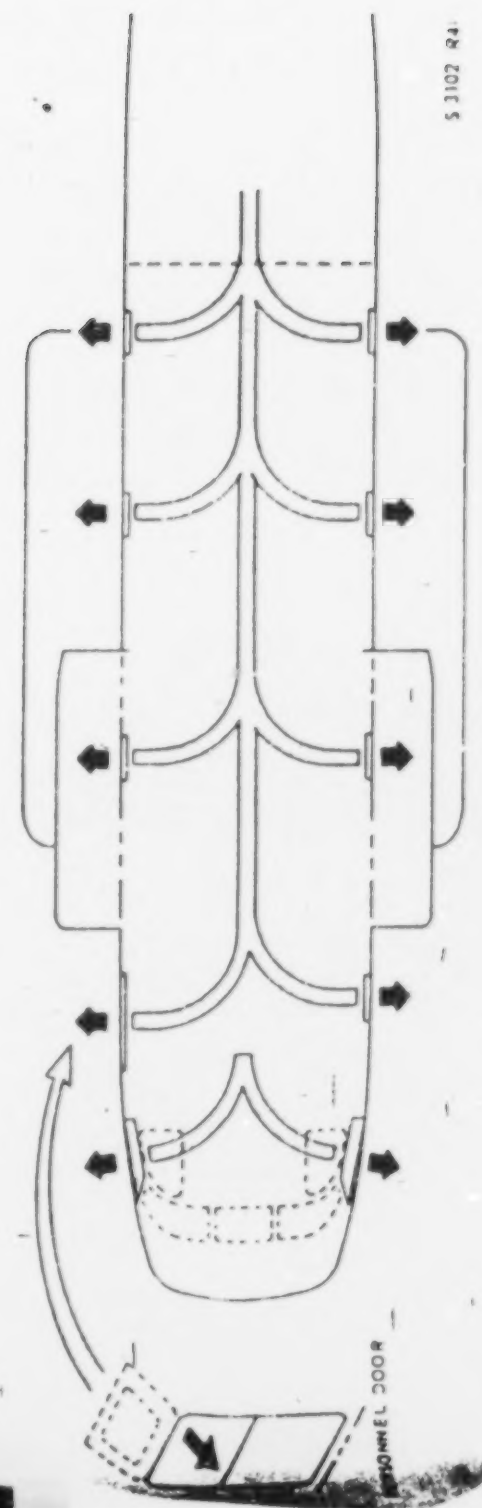


Figure 5-4. Evacuation Exits When on the Water

PLAINTIFF'S EXHIBIT 73

NAVAIR 05-45SK-66

TECHNICAL MANUAL
ILLUSTRATED PARTS BREAKDOWN
AUTOMATIC FLIGHT CONTROL SYSTEM
FORE-AND-AFT AND LATERAL
SERVOCYLINDER ASSEMBLY

* * *

AUTOMATIC FLIGHT CONTROL SYSTEM
SECONDARY DIRECTIONAL
SERVOCYLINDER ASSEMBLY

PART NO.

64658-03103-045

Sikorsky

* * *

Published By Direction Of
Commander, Naval Air Systems Command

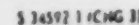


Figure 1. AFCS fore-and-aft and lateral, and secondary directional servocylinder assembly (sheet 1 of 6)

PLAINTIFF'S EXHIBIT 77

NAVAIR 01-230HMA-2-2.3

TECHNICAL MANUAL
MAINTENANCE INSTRUCTIONS
Organizational And Intermediate
FLIGHT CONTROL SYSTEMS

NAVY MODELS
CH-53A AND CH-53D
HELICOPTERS

(Sikorsky)

• • •

15 NOVEMBER 1970
Change 38 — 15 April 1984

• • •

NAVAIR 01-230HMA-2-2.3

Section II
Paragraphs 2-1 to 2-9

SECTION II
SYSTEM DESCRIPTION

2-1. *FLIGHT CONTROL SYSTEMS.*

2-2. *DESCRIPTION.* (See figure 2-1.) The flight controls consist of the collective, cyclic, and directional (rotary rudder) control systems. These systems consist of a series of push-pull rods, bell-cranks, servos, pulleys, and cables which transmit control movements to the rotary wing and to the rotary rudder. Dual controls are provided for the pilot and copilot. Cyclic control sticks control forward, aft, and lateral helicopter movements; col-

lective control sticks control vertical helicopter movements; and directional control pedals control helicopter headings. Control can also be accomplished automatically through the Automatic Flight Control System (AFCS). The AFCS, which is monitored by the pilot or copilot, improves and assists in helicopter handling, and permits hands-off attitude stabilization. In addition, a fine degree of cyclic and collective control may be obtained through the AFCS servocylinders under signal from the stick trim system. Hydraulic power is supplied by the first stage, second stage, and utility hydraulic systems. Electrical power is supplied by the ac and dc electrical system.

* * *

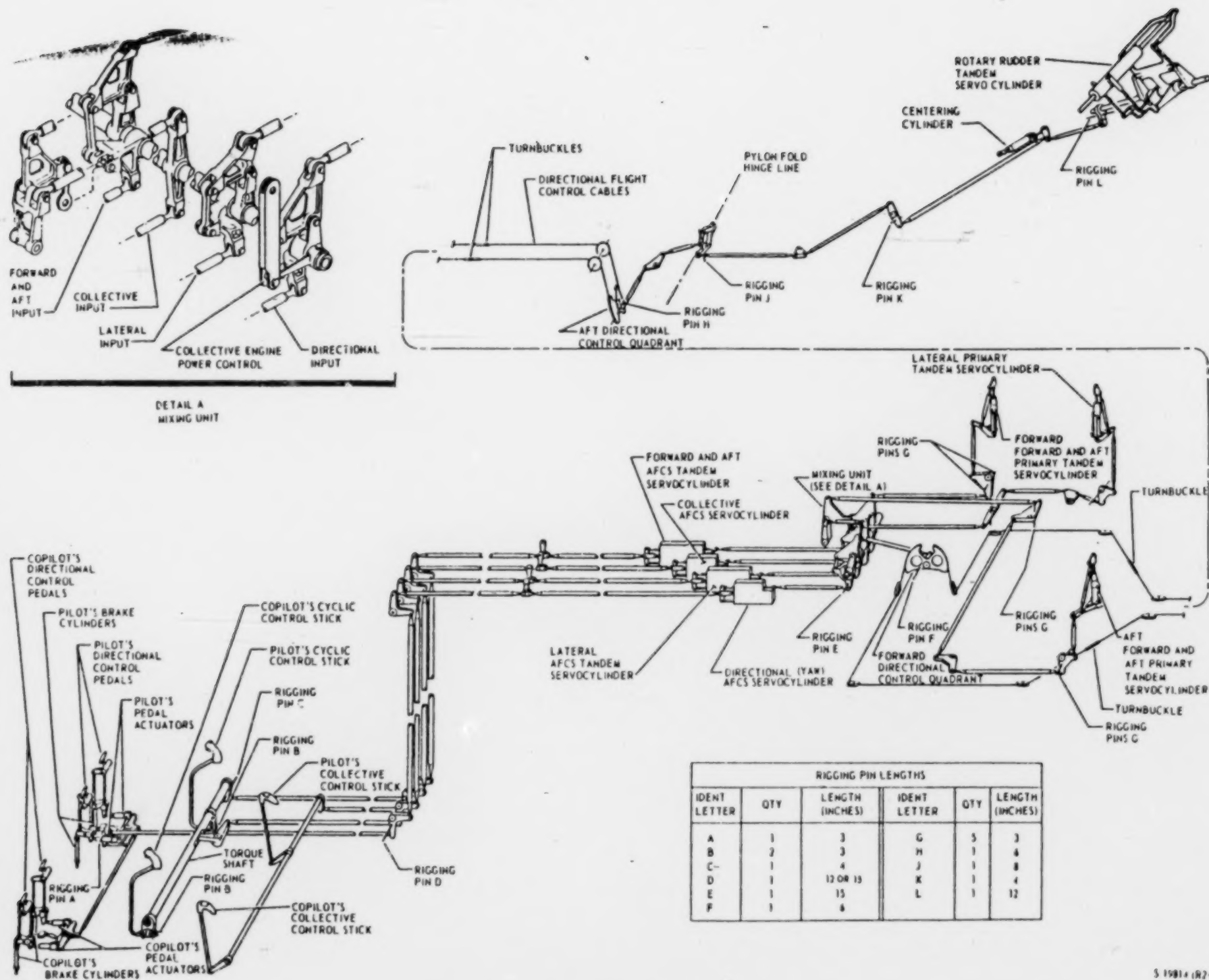


Figure 2-1. Flight Control Systems

PLAINTIFF'S EXHIBIT 80

NAVAIR 01-230HMA-1F

NATOPS

FUNCTIONAL

CHECKFLIGHT CHECKLIST

NAVY MODEL

CH-53A,D

HELICOPTER

* * *

ISSUED BY AUTHORITY OF THE CHIEF OF NAVAL
OPERATIONS AND UNDER THE DIRECTION OF
THE COMMANDER, NAVAL AIR SYSTEMS
COMMAND

15 APRIL 1983

* * *

3. Control System Force Checks (servos)

a. Control breakout forces should not be over:

Longitudinal cyclic: 14 ounces

Lateral cyclic: 12 ounces

Collective (midposition): 6 pounds with a
maximum of 4.5 pounds and minimum of
3 pounds during collective movement

Pedals: 8 pounds

* * *

PLAINTIFF'S EXHIBIT 88

MIL-C-18244A (WEP)
1 DECEMBER 1962

MILITARY SPECIFICATION

CONTROL AND STABILIZATION SYSTEMS:
AUTOMATIC, PILOTED AIRCRAFT, GENERAL
SPECIFICATION FOR

* * *

1. SCOPE

1.1 *Scope*—This specification covers design, test and performance requirements for either GFE or CFE automatic control and stabilization systems for all U.S. Navy piloted aircraft. In the event of conflict between this specification and other referenced documents the requirements of this specification shall govern. The detail requirements for a particular system shall be as specified in the detailed specification, contract or purchase order for that system. (See 6.2)

* * *

3.1.1.3.6 *Overpower*—With the automatic flight control system engaged and operating, it shall be possible to manually overpower or countermand the control action of the system on all axes. For fixed-wing aircraft the maximum steady forces required to maneuver the aircraft within its design limits about all axes, subsequent to overpowering or countermanding control system action shall not exceed the values specified in Sections 3.3 and 3.4 of Specification MIL-F-8585; in addition the maximum instantaneous forces shall not exceed 120 percent of the maximum steady force.

* * *

3.1.1.3.10 *Control Stick (or Wheel) Maneuvering*—

Where control stick maneuvering is a system requirement, provisions shall be made so that the pilot shall have full capability to maneuver the aircraft within control forces and maneuver limits specified in Specification MIL-F-8785 or the applicable system specification. This maneuvering capability shall be possible at any time when the automatic flight control system is engaged by using the normal aircraft controls. Unless otherwise specified in the applicable system specification, design shall be such as to allow the pilot to super-impose his control stick maneuvering commands over those of external guidance system signals. Cross control between the pitch and roll force sensors shall not exceed one percent of the applied forces.

* * *

DEFENDANT'S EXHIBIT 11

SD-24H
Vol. IIGENERAL SPECIFICATION
for
DESIGN AND CONSTRUCTION
of
AIRCRAFT WEAPON SYSTEMS

* * *

VOLUME II—ROTARY WING AIRCRAFT

FOR OFFICIAL USE ONLY

DATE: 13 MARCH 1959

DEPARTMENT OF THE NAVY
BUREAU OF AERONAUTICS
WASHINGTON 25, D. C.

* * *

3.7.1.7.1 MANUAL ESCAPE EXITS.

Manual escape exits shall be provided as necessary to permit ready and safe egress of rotary wing aircraft occupants in an emergency. All hatches, doors, windows, or ports, which are to be used as emergency escape exits, shall be quick opening, easily operable, and shall be jettisonable when in the fully closed position, the fully open position, and in any intermediate position between fully closed and fully open.

* * *

DEFENDANT'S EXHIBIT 13

SD-552-1-3

DEPARTMENT OF THE NAVY
NAVAL AIR SYSTEMS COMMAND
WASHINGTON, D.C. 20360
DETAIL SPECIFICATION
FOR
MODEL CH-53D HELICOPTER
FISCAL YEAR 1969

* * *

DATE 12 July 1968

3.7.1.7 EMERGENCY ESCAPE—Emergency escape shall be provided for pilot and copilot through both cockpit side windows which shall be readily jettisonable. Both internal and external handles shall be provided to actuate the release mechanism. The handles of the release mechanism shall be so located, shaped and provided with detents as to prevent inadvertent actuation.

* * *

3.10.3 AUTOMATIC FLIGHT CONTROL SYSTEMS

3.10.3.1 BASIC AUTOMATIC FLIGHT CONTROL SYSTEM (AFCS)—An AFCS shall be provided in accordance with a contractor-prepared specification as approved for the prototype and shall have the following characteristics:

- (a) Maneuvering control of the aircraft under automatic control shall be effected through the manual flight controls.

* * *

DEFENDANT'S EXHIBIT 18

DEPARTMENT
NAVYCONTRACT NO.
NOW 63-0150-f

FIXED PRICE CONTRACT

* * *

Received By

BUREAU OF NAVAL WEAPONS
WASHINGTON 25, D. C.

CONTRACTOR (Name and Address)

UNITED AIRCRAFT CORPORATION
(SIKORSKY AIRCRAFT DIVISION)
Stratford, Connecticut

* * *

UNITED AIRCRAFT CORPORATION
(SIKORSKY AIRCRAFT DIVISION)
Name of Contractor

Stratford, Connecticut

by _____ (signature illegible)
Signature2/6/62
Date

UNITED STATES OF AMERICA

By A. S. Nunnally
Signature of Contracting OfficerFebruary 19, 1962
DateA. S. Nunnally
Typed Name of Contracting Officer

* * *

P110 SECTION OO—DESIGN RESPONSIBILITY

In releasing design data or drawings, or in releasing aircraft for flight, the Government accepts no responsibility for the successful operation of the equipment manufactured by the Contractor.

* * *

CONTRACT NOW 63-0150-f

P114.A-1-2 SECTION SS—ACCEPTANCE

* * *

(2) Provisional Acceptance

* * *

(b) . . . The Government shall, if the aircraft is provisionally accepted and removed from the Contractor's custody, assume all risk of loss or damage to the aircraft and the Government-furnished Property installed therein; provided, however, that the obligations of the Contractor with respect to correction of defects shall be as specified in the clause hereof entitled "Correction of Defects".

-58-

* * *

CONTRACT NOW 63-0150-f

PIA.1-1 SECTION TT—CORRECTION OF DEFECTS

Except for fraud, or such gross mistakes as amount to fraud, the Contractor's obligations with respect to correction or replacement of supplies delivered by the Contractor

to the Government under this contract shall, after delivery thereof, consist solely of those set forth in this clause.

(a) Right to Corrective or Replacement Action.—The Government shall have the right to require the Contractor to remedy, and the Contractor shall with due diligence remedy by correction or replacement, at the Contractor's election, at no increase in the contract price, any defects in material or workmanship or any failure to conform to the requirements of this contract.

* * *

-61-

DEFENDANT'S EXHIBIT 20

CONTRACT Page
1

* * *

Received By

DEPARTMENT OF THE NAVY
NAVAL AIR SYSTEMS COMMAND
WASHINGTON, D.C. 20560

12/31/68

Contractor
Name And Address

UNITED AIRCRAFT CORPORATION
Sikorsky Aircraft Division
Stratford, Connecticut 06602

14. Name of Contractor/Officer
By P. W. Holt

UNITED AIRCRAFT CORP.
Sikorsky Aircraft Division

17. United States Of America
by (Signature illegible)
(Signature of Contracting Officer)

15. Name and Title of Signer
P. W. Holt, D. V. Vice-Pres.-

12/14/68

12/14/68

N00019-68-C-0471

SCHEDULE

* * *

F-9 DESIGN RESPONSIBILITY
(577) (AIR)

In releasing design data or drawings, or in releasing aircraft for flight, the Government accepts no responsibility for the successful operation of the equipment manufactured by the Contractor.

-35-

* * *

N00019-68-C-0471

SCHEDULE

F-14 CORRECTION OF DEFECTS
(582-1) (FP) (AIR)

Except for fraud, or such gross mistakes as amount to fraud, the Contractor's obligations with respect to correction or replacement of supplies delivered by the Contractor to the Government under this contract shall, after delivery thereof, consist solely of those set forth in this clause.

(a) Right to Corrective or Replacement Action.—The Government shall have the right to require the Contractor to remedy, and the Contractor shall with due diligence remedy by correction or replacement, at the Contractor's election, at no increase in the contract price, any defects in material or workmanship or any failure to conform to the requirements of this contract.

* * *

DEFENDANT'S EXHIBIT 31

84-0486-R

UNITED TECHNOLOGIES
SIKORSKY AIRCRAFT

Internal Correspondence

To: T. Dixon

Fm: K. Wallischeck

Re: CH-53A/D Servo Valve Investigation

Dt: 3 June 83

As a result of the CH-53A alleged control problem at Norfolk, VA, we looked at and investigated some of the chip-shear characteristics of the Model 10 Moog dual input servo valve. Tests were performed on a P/N 65652-03177-105 (Moog P/N 10-121A) valve which is the unit used on CH-53 models on the roll AFCS servo.

* * *

The power piston area is .199 to .20 in². At stall this yields a 200 lb. force. Reaction force of the pilot to overcome this force is 45 lbs. To reverse the direction of a hardover motion requires the pilot to also overcome the servo frictional forces, which are approximately 40 lbs (system pressurized). This results in a pilot effort of about 55 lbs to overcome a hardover.

* * *

- A 55 lb force at the stick can overcome a hardover servo.

* * *

PLAINTIFF'S EXHIBIT 25

U

Sikorsky Aircraft Division of United Aircraft Corporation

A

TITLE: HYDRAULIC SYSTEM DEMONSTRATION FOR CH-53A HELICOPTER

REPORT NUMBER: SER - 65259

PREPARED UNDER:

REPORT DATE: September 30, 1966

REPORT PERIOD:

This report is applicable to the following aircraft model(s) and contract(s):

Model	Contract
CH-53A	NOw 63-015Of

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Prepared by /s/ J.V. Hickey/N.M. Blondin

Checked by /s/ P. Griswold

Approved by /s/ P. D'Ostilio

REVISIONS

Rev.	Changed By	Revised Page(s)	Added Page(s)	Deleted Page(s)	Description	Date Approval
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Revisions Continued on Next Page

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CONCLUSIONS

The engine start system has been improved and meets specifications with the New York Air Brake winch/starter pump (Part No. 64 WHO 8001) and the RH-3A hydraulic oil cooler (Sikorsky Part No. 6168-63585) installed in the system as tested per Flight Test Plan 65E-34. These changes will be incorporated in production aircraft. Cargo winch performance was considered satisfactory but it appears that pendant control design and cabin position of the operator result in awkward winch operation. Improvements in this system are being considered.

Landing gear operation including gear extension and retraction times was considered to be satisfactory. The gear retraction time of 10.15 seconds as shown in the time history plot of Figures # 14 and #15 was considered to be within tolerance of the 10 second limit. Other gear retraction times were below the 10 second limit as evidenced by the retraction time of 9.9 seconds in Table #11. A restrictor in the landing gear hydraulic line is being investigated to increase the pressure to the nose gear to maintain simultaneous main and nose landing gear retraction. Wheel brake operation was satisfactory during the testing. Im-

proved self-adjusting brakes were installed in two of the B.I.S. CH-53A aircraft during B.I.S. trials at Patuxent River NATC in August, 1966. These brakes were operated satisfactorily at the B.I.S. trials and are being incorporated in standard production aircraft. They are Goodrich self-adjusting wheel brake assemblies (Part No. 2-962-1) with a 60 psi back pressure capability at the brake pucks.

Tail pylon and rotor blade fold/spread, aft door and ramp open and close and rotor brake system operations were satisfactory. Manual tail pylon fold/spread, manual APP accumulator recharging and emergency landing gear extension were all successful. Operation of the first and second stage hydraulic systems including primary and AFCS servos was normal and satisfactory during the testing.

With the modifications to the APP installation which are to be incorporated in production aircraft, the APP operation is satisfactory and meets the military specification and demonstration requirements.

It is concluded that the results of the CH-53A hydraulic system ground and flight tests satisfy the design and operational test requirements of References #1, #2 and #3, including the applicable pressure and temperature requirements of References #2 and #3.

RECOMMENDATIONS

Based on the results presented herein, it is recommended that the hydraulic system be considered acceptable for service use in the CH-53A helicopter.

REFERENCES

1. Bureau of Naval Weapons Specification, "Demonstration Requirement for CH-53A Helicopter", dated December 11, 1962.
 2. Military Specification MIL-T-5522B, dated June 22, 1955, "Test Procedure for Aircraft Hydraulic and Pneumatic Systems, General".
 3. Military Specification MIL-H-5440B, dated July 9, 1956, "Hydraulic Systems: Design Installation and Tests of Aircraft (General specification for)".
 4. Sikorsky Aircraft Report, SER-65254, dated December 19, 1964, "CH-53A Helicopter Demonstration Data", Revision 10, report period May 20, 1966 through July 19, 1966, page Nos. IV-F-4h through IV-F-72.
 5. Sikorsky Aircraft Drawing S65650-00100 Revision B, dated February 22, 1966, "Circuit Diagram, Complete Utility System".
 6. Sikorsky Aircraft Drawing S65650-00150 Revision C, dated May 20, 1966, "Circuit Diagram, Hydraulic System AFCS and Primary".
-

PLAINTIFF'S EXHIBIT 26

SIKORSKY AIRCRAFT

U

Division of United Aircraft Corporation
A

TITLE: SUBSTANTIATION TESTS OF
CH-53A CONTRACTOR DE-
SIGNER HYDRAULIC FLIGHT
CONTROL ACTUATORS AND
NON-STANDARD FITTINGS

REPORT NUMBER: SER-65099

PREPARED UNDER:

REPORT DATE: November 30, 1967

REPORT PERIOD:

This report is applicable to the following aircraft model(s)
and contract(s):

Model	Contract
CH-53A	NOW63-0150f

Prepared by /s/ W. Throp R. Holt

Checked by /s/ W. H. Morrissey

Approved by /s/ J. N. Hendel; R. M. Kee

REVISIONS

Rev.	Changed	Revised	Added	Deleted	Description	Date	Approval
	By	Page(s)	Page(s)	Page(s)			

Revisions Continued on Next Page

SUMMARY

Substantiation tests completed to date of the Contractor designed hydraulic components for the Model CH-53A Helicopter are reported herein.

Test methods and procedures, results, and conclusions for specific hydraulic components, as specified in the Contractor's test proposal are reported herein. These components are:

<u>Nomenclature</u>	<u>Part Number</u>	<u>Test Status</u>
Tail Rotor Primary Servo	65652-07101-041	Complete
Main Rotor Primary Servo	65652-11101-042	Complete
AFCS Servo Assemblies	65652-03101-049 & 051 65652-03102-045 65651-03103-045	Complete
Swivel Joint Assembly	65651-06011-041	Complete
Rotor Joint Assembly	6165-20583	Complete

Results of tests performed upon other Contractor designed components are reported in Reference (h). This report will be retained by the Contractor and will be available to the Naval Air Systems Command upon request. This report includes tests performed upon the following components:

<u>Nomenclature</u>	<u>Part Number</u>	<u>Test Status</u>
Pylon Fold Actuator	65651-06301-042	Complete
Pylon Lock Pin Actuator	65651-06351-041	Complete
Rotor Head Positioner Actuator	65641-11401-041	Complete
Cargo Ramp Actuator	65641-06101-041	Complete
Cargo Ramp Up-Lock Actuator	1565-61351	Complete
Cargo Door Actuator	65651-06201-041	Complete

SUMMARY (Continued)

<u>Nomenclature</u>	<u>Part Number</u>	<u>Test Status</u>
Blade, Fold Sleeve-Spindle Ass'y. (Actuator)	65102-11000-074	In process
Blade Lock Pin Actuator	65651-11316-046	In process
Pylon Sequence Valve	65651-06023-041	Complete
Pylon Lock Pin Actuator Sequence Valve	65651-06364-041	Complete
Rotor Head Positioner Actuator Sequence Valve	Integral part of: 65651-11401-041	Complete
Cargo Ramp Sequence Valve	65651-06023-042	Complete
Blade Fold Sequence Valve	65651-11276-048	In process
Blade Lock Pin Actuator Sequence Valve	Integral part of: 65651-11316-046	In process
Manifold Assembly	65651-11050-011	Complete
Main Rotor Damper	65106-11100-043	Complete
Main Rotor Damper Accumulator	65106-11118-041	Complete

Installed systems Ground and Flight tests were successfully completed and reported in Reference (i).

Main Rotor Primary Servo 65652-11101-042 sustained fatigue fractures during endurance and structural substantiation tests which necessitated establishing a 300 hour* replacement time. A redesigned servo, 65652-11101-047, incorporates steel sleeves and shot-peened housing. This design has been substantiated for a 4000 hour replacement time. Since the modes-of-failure were not wear, it is believed that the percent increase in strength more than adequately substantiates the servo for the 200,000 cycle endurance requirement.

*Subsequently increased to 350 hours in accordance with Reference (0).

SUMMARY (Continued)

Testing of the AFCS Servos was suspended at the completion of 100,000 endurance cycles to incorporate several design changes. After design updating the AFCS Servos were re-subjected to extreme temperature testing and endurance testing was completed (total of 200,000 cycles).

The 65652-03103-045 AFCS Servo Assembly sustained fatigue fractures of the 65652-03137-101 guide during endurance and structural substantiation tests which necessitated establishing a 500 hour replacement time. A redesigned servo, 65652-03103-049 (see Reference (k)), incorporates a steel guide, which has been substantiated for an unlimited replacement time.

The 65652-03102-045 AFCS Servo Assembly sustained a static fracture of the 65652-03122 trim piston assembly upon completion of endurance tests and during structural substantiation tests which necessitated establishing a 1000 hour replacement time. Redesigned servos, 65652-03101-055, -057, and 65652-03102-048 (See Reference (1)), incorporate redesigned trim piston assemblies.

Supplementary endurance test results for the AFCS Stick Trim Servo Valve are reported in Appendix I.

Endurance testing of the Blade Fold Actuating Cylinders and Sequence Valves has been suspended pending incorporation of a redesigned pitch lock mechanism and the evaluation of changes to the Blade Lock Pins to eliminate scoring encountered during early portions of endurance testing.

One general problem was encountered during tests on most of the components. This was a problem with the hydraulic seal performance during and following extreme temperature tests. Seals are procured under the Military Specification for packings to be used for +275°F service. After ex-

posure to 275° the seals became hard and brittle. During endurance tests seals cracked or were permanently deformed. These problems resulted in excessive seal leakage.

Reduction in the soak time at high temperature from seven days to 72 hours did not improve the characteristics. However, seals tested at temperatures up to 250°F did not exhibit these characteristics.

With the incorporation of a heat exchanger in the Utility System, temperatures in all systems do not exceed 250°F as demonstrated during the ground and flight tests.

It is concluded that:

1. The hydraulic system ground and flight tests have been successfully completed.
2. The hydraulic components having completed bench test as noted above are substantiated for use on the CH-53A Helicopter.
3. Hydraulic Packings procured under current Military Specifications for Type II systems should not be used at temperatures exceeding 250°F.

It is recommended that Military Specification MIL-P-25732 be revised to ensure that O-rings meeting the specification can operate continuously, without deformation or leakage, at 275°F.

Upon completion of tests in process, this report will be revised to report the results of those tests.

PLAINTIFF'S EXHIBIT 83

Sikorsky Aircraft Division of United Aircraft Corporation

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Title: CH-53A Hydrodynamics Loads and
Hydrodynamic Stability

Submitted Under: Paragraphs 3.5.5 and 3.5.7 of MIL-A-8868 (ASG) as required by Paragraph 3.6.10 of Addendum No. 163 to Mil-D-8706 A (WEPS).

Report No.	Date	Model	Contract No.
SER-50296	May 16, 1963	CH-53-A	NOw 63-0150f

REVISIONS

DATE	RELEASED BY	PAGES AFFECTED	REMARKS	TOTAL PAGES
	Prepared By /s/ D. W. Lowry	/s/ J.A. Pisano	/s/ J.P. Olson	
	Checked By /s/ M. J. Rich	Approved By /s/ E. S. Carter		
	/s/ R. B. Lightfoot, Chief Engineer			

PAGE NO. i

1.0 SUMMARY

The CH-53A helicopter has been analyzed for hydrodynamic load factors and hull pressures. The conditions of analysis are for forward speeds of 0 to 30 knots in combina-

tion with sinks speeds of 8 fps at 0 to 20 knots forward speed linearly reduced to 4 fps at 30 knots forward speed. Trim angles at water entry are from 3° nose up to 15° nose up. Unsymmetrical entry conditions have been investigated for a yaw angle of 15° and for a roll angle of 10° acting separately. The pressures and load factors calculated include the effects of sea state 2 wave conditions. The helicopter lands with rotor lift equal to 2/3 gross weight for all conditions.

Hydrodynamic stability has been investigated to determine righting moment vs. roll angle capability including effects of lateral and vertical C.G. positions. Based on the static rolling analysis and semi-empirical data the helicopter is stable for the condition of a 39.5 knot side wind in calm water, and exceeds the requirements for stability in sea state 2 conditions.

This report is submitted under Paragraphs 3.5.5 and 3.5.7 of MIL-A-8868 (ASG) as required by Paragraph 3.6.10 of Addendum No. 163 to MIL-D-8706A (WEPS).

* * *

PLAINTIFF'S EXHIBIT 88

* * *

MIL-C-18244A (WEP)

3.1.1.2.3. *Interchangeability* — All assemblies having the same manufacturer's part number shall be directly and completely interchangeable with respect to installation and performance without adjustment.

3.1.1.2.3.1 *Reordered Equipment or Second Source Procurement* — Where models or drawings of components of systems are furnished by the procuring activity on a contract to facilitate interchangeable construction, or where procurement is for equipment to provide interchangeable use with equipment previously procured, and the requirements for interchangeability contradict the current requirements of one or more MIL specifications, the contract requirements for interchangeability shall govern without additional approval by the procuring activity.

3.1.1.2.4 *Repairability* — No assembly or subassembly shall be encapsulated or permanently sealed without written approval of the procuring activity. This requirement is established to insure access whenever necessary to repairable parts in components and/or assemblies.

3.1.1.3 *Functional Design Requirements*

3.1.1.3.1 *Conditions for Engagement* — Unless the automatic flight control system and integrated portions of other systems are properly energized and synchronized, it shall not be possible to engage the system or to switch from one functional category or mode of operation to another. It shall be possible to engage the augmentation mode independently of any other function or mode of the automatic

flight control system. No control transients, which exceed the limits of 3.1.1.4.3, shall occur when switching from one functional mode of operation to another or when disengaging the system. Unless otherwise specified in the system specification, all control axes shall be engaged and disengaged simultaneously. Means shall be provided so that the pilot can visually determine the operation status of the system.

3.1.1.3.2 *Warm-Up* — After the application of power, the warm-up time required shall be not more than 90 seconds for fighter or attack type aircraft and not more than 3 minutes for other types of aircraft.

3.1.1.3.3 *Synchronization* — The system design shall be such that, upon engagement, the aircraft's attitude or other control mode will be maintained, or the aircraft will be displaced at a predetermined rate to a predetermined attitude as defined in the system specification covering the particular automatic flight control system. Synchronization indication, if required, shall be as specified in the system specification. The synchronization rate shall be such that no transients exceeding the limits of 3.1.1.4.3 shall occur due to system engagement or mode switching after the completion of any maneuver up to the maneuver limits of the aircraft.

3.1.1.3.4 *Disengagement* — Provisions shall be made for inflight disengagement and reengagement of the automatic flight control system. Disengagement shall be positive under any and all load conditions. Disengagement switches shall be normally closed and shall be located in accordance with the requirements of MIL-STD-203. A disengagement not initiated by the pilot shall be indicated by

means which shall be approved by the procuring activity. In the event that servo disengagement should result from action of the structural protective means, the circuitry shall provide for immediate re-engagement at the pilot's discretion.

3.1.1.3.5 *Series Actuators* — The series actuators shall, after deactivating, be positively centered and capable of transmitting full control system load without creep. The rate of centering shall be such that no undesirable transients will be introduced. Unless a dual cross monitoring system, including dual separate actuators with a common output is used, series actuators having more than 40 percent primary control authority shall not be used.

3.1.1.3.6 *Overpower* — With the automatic flight control system engaged and operating, it shall be possible to manually overpower or countermand the control action of the system on all axes. For fixed-wing aircraft the maximum steady forces required to maneuver the aircraft within its design limits about all axes, subsequent to overpowering or countermanding control system action shall not exceed the values specified in Sections 3.3 and 3.4 of Specification MIL-F-8585; in addition the maximum instantaneous forces shall not exceed 120 percent of the maximum steady force.

* * *

DEFENDANT'S EXHIBIT 11

SD 24H
Vol. II

Froth

GENERAL SPECIFICATION
for
DESIGN AND CONSTRUCTION
of
AIRCRAFT WEAPON SYSTEMS
(SEAL)VOLUME II — ROTARY WING AIRCRAFT
FOR OFFICIAL USE ONLY

DATE 13 MARCH 1959

DEPARTMENT OF THE NAVY
BUREAU OF AERONAUTICS
WASHINGTON 25, D.C.

* * *

shall be located to prevent any adverse effects of rough water.

3.6.2.2 STABILIZER.

The stabilizer consists of panels complete with attachments. Stabilizers may be fixed or adjustable and shall be easily removable. Sufficient adjustment shall be provided in the stabilizer (or equivalent) to give satisfactory balance for all specified conditions of loading and ranges of speed. Stabilizers constructed as integral parts of the fuselage shall be detachable as a unit with a portion of the fuselage.

One-piece stabilizers shall be removable from the fuselage without disassembly. Detachable tips shall be provided to facilitate repair of stabilizers.

3.6.2.3 ELEVATORS.

Elevators shall consist of the panels with attached fittings, trimming surfaces, control horns, hinge-pins, bolts and nuts, or other fastenings ready for attachment to the stabilizer and for attachment of flight controls. Elevators which overhang stabilizers shall be provided with detachable tips. Movement of elevators shall be adequate for the control for which the rotary wing aircraft is designed. There shall be no mechanical interference between the surfaces of the elevator and rudder and other parts of the rotary wing aircraft for any combination of control-surface settings within the range of movements of the control surfaces.

3.6.2.4 FINS.

Fins constructed as integral parts of the fuselage shall be detachable as a unit with a portion of the fuselage. Detachable tips shall be provided on fins of carrier-based rotary wing aircraft.

3.6.2.5 RUDDERS.

Rudders shall consist of panels with attached fittings, trimming surfaces, integral torque tubes, attached levers, control horns, pins, bolts and nuts, or other fastenings ready for attachment to the fin and for attachment of flight controls.

3.6.2.6 ELEVATOR AND RUDDER STOPS.

Additional movement of the elevator and rudder shall be provided so that the limit of movement may be controlled

by stops rather than by jamming the hinges or the control surface proper.

3.6.2.7 ARTIFICIAL TRIM.

Artificial trim shall be provided when specified in the detail specification.

3.7 BODY GROUP.

The body group consists of fuselage.

3.7.1 FUSELAGE

3.7.1.1 DESCRIPTION.

The fuselage shall include all crew and personnel stations, cargo compartments, equipment compartments, etc.

3.7.1.2 CONSTRUCTION.

Construction of the fuselage shall meet the requirements specified herein and in the detail specification.

3.7.1.3 CREW AND PERSONNEL STATIONS.

Crew and personnel stations shall be arranged to conform to the best human engineering practices and shall be suitable for carrying out the operations required. Crew stations shall be so arranged that no portion of any person will be within five degrees forward or five degrees aft of the plane of rotation of the jet-engine turbine blades, measured from the center of the propeller hub or turbine rotor. The safety of the crew in the case of major accidents shall be carefully considered. Particular attention shall be given to the elimination of sharp corners on windshields and projections in the cockpit on which the members of the crew may strike their heads in severe or crash landings. The instrument panels in front of the crew shall be as smooth

as practicable. Handles and knobs that must be located in front of the heads of the crew shall be recessed flush with the instrument panels or covered with soft rubber pads. Ditching stations shall be provided for members of the crew when normal crew stations are inadequate for ditching. So far as practicable, such stations shall face aft. The arrangement of crew and personnel stations shall be subject to Mockup Board approval.

3.7.1.3.1 PILOTS' COCKPIT.

Basic cockpit dimensions shall be in accordance with DWG MS 33575. Cockpits shall be completely compatible for pilot(s) (lower limit five percentile man, upper limit 95 percentile man as specified in Wright Aeronautical Development Center (WADC) Technical Report 52-321) with full personal flight gear (see 6.5.13). Cockpits shall be arranged to permit unrestricted movement of all controls through their specified range. Equipment shall be so arranged that movements of the occupant involved in the normal operation of rotary wing aircraft equipment shall not interfere with any controls. The location and actuation of cockpit controls shall be in general accordance with MIL-STD-250. Drains shall be provided at the low points of cockpits of carrier based rotary wing aircraft.

Unless undue complexity of control actuation results, the cockpits of multi-place carrier based rotary wing aircraft shall be so arranged that, for noncombat operations, such as ferry and carrier qualification flights, the rotary wing aircraft can be operated with only the pilot aboard.

3.7.1.3.1.1 COCKPIT AND CABIN ENCLOSURES.

Cockpit and cabin enclosures shall be watertight when the rotary wing aircraft is at rest or in flight. Provision

shall be made to protect weather seals from damage as a result of normal maintenance activities and from normal entrance and egress by the crew. All parts within 24 inches of the magnetic compass shall be of non-magnetic material. Enclosures shall be constructed of laminated plate glass or transparent plastic construction specifically approved for the installation by BUAER. The transparent materials shall be securely anchored within the supports, but, where feasible, shall be free to expand and contract with changes in temperature and aging without distorting the structure or impairing the efficiency of the joints. The combination of transparent materials and support frames shall be sufficiently rigid to withstand all probable loads imposed in flight, landing, and handling without either elastic deflections or permanent deformations of magnitudes which will adversely affect the proper functioning of the enclosure elements. Consideration shall be given to the interaction between transparent components and frame caused by thermal effects under extreme temperature conditions to insure that stress concentration in the transparent components is kept to a minimum. Transparent plastic enclosure elements shall incorporate edge attachments of the laminated-type based on glass fabric or other suitable textile to reinforce the edges and restrain crack initiation. Accessories or equipment shall not be attached to the transparent element of the cockpit or cabin enclosure.

3.7.1.3.1.1.1 COCKPIT ENCLOSURES.

Cockpit enclosures shall be provided with movable sections and shall readily permit normal entrance and exit of the crew. Provision shall be made to normally open and close the movable sections from inside and outside the cock-

pit when the rotary wing aircraft is at rest. Provision also shall be made to open and close the movable sections from inside and outside the cockpit when the rotary wing aircraft is at rest without power and with the battery removed. Means shall be provided to readily jettison the movable sections from the rotary wing aircraft from both inside and outside the cockpit in the event of a crash to facilitate crew exit and rescue operations. Provision shall be made for preflight inspection of rigging of locks and release to insure proper engagement. External emergency movable sections releases shall be provided on both left and right sides. Movable sections actuation components and accessories shall not be located forward of the cockpit area. Provision shall be made to prevent inadvertent actuation of internal movable sections control handles while entering or leaving the cockpit and performing maintenance on the rotary wing aircraft. All external movable sections control handles and doors shall be suitable for operation by personnel wearing fire fighters insulated gloves.

Movable sections shall be readily jettisonable in flight and shall not contact the rotors or horizontal tail surfaces. Instantaneous actuation is desired. Movable sections of carrier-based rotary wing aircraft shall be readily jettisonable when submerged up to a depth of 15 feet of water. Sliding movable sections of carrier-based rotary wing aircraft shall be readily opened when submerged up to a depth of 15 feet of water. Movable section of the sliding type shall positively lock in the fully open and fully closed positions and the locking provision shall withstand 20g crash deceleration loads. Provision shall be made at the fully open and fully closed positions of movable sections to pro-

tect the tracks and rollers from failure due to wear caused by vibration.

3.7.1.3.1.1.2 CABIN ENCLOSURES.

Cabin enclosures shall be provided with sliding panels on each side when specified in the detail specification. Provision shall be made to latch sliding panels in the fully open and fully closed positions. Such latching provision shall be capable of withstanding 20g crash deceleration forces. All openings shall latch securely in the closed position from the inside. (For minimum size of escape exits, see 3.7.1.7.1.)

3.7.1.3.1.2 WINDSHIELDS.

A windshield shall be provided for each cockpit enclosure or cabin enclosure of all rotary wing aircraft, except for bubble type enclosures. Windshields shall safely withstand the airloads imposed by the flight requirements specified for the rotary wing aircraft. Consideration shall be given to loads imposed by impact with birds. The transparent construction of the windshield shall be as approved by BUAER. Surfaces used in contact with windshield wipers shall be of inorganic glass.

3.7.1.3.1.3 VISION.

The maximum practicable vision shall be provided for the pilot(s). Vision is particularly important in regard to tactical utilization of the rotary wing aircraft, collision with other rotary wing aircraft in flight or on the ground, and for carrier landing. Radii-of-curvature and angles-of-incidence shall be employed consistent with aerodynamic structural, and fabricating considerations, which will result in the least possible optical distortion in the transparent components, and prevent reflections of objects both within

and without the cockpit from interfering with pilot's vision. Means shall be provided to insure visibility in heavy rain for taxiing, takeoff, approach and landing. Vision shall be subject to Mockup Board approval.

* * *

openings shall admit packages of the maximum practicable dimensions so that as varied a cargo as possible may be carried. The main side cargo-loading openings, unless such openings are symmetrical about the centerline of the rotary wing aircraft, shall be on the pilot's side. Cargo doors shall be flush with the floor except where it is required to make them watertight or pressure-tight. Cargo door locations and the manner of opening shall render minimum interference to cargo loading and unloading, and shall not restrict the use of loading platforms, cranes, fork lift trucks, etc. for transferring cargo. Servicing of the rotary wing aircraft shall be possible without interference with loading or unloading when done simultaneously. Attention shall be given to the ease of opening cargo doors, preferably by one man. Positive means shall be provided to keep doors open during cargo loading and unloading operations. Latches and securing devices on cargo doors shall be positive-acting in order to avoid cargo doors opening unintentionally in flight.

3.7.1.6.3 HATCHES.

Hatches and other openings with covers shall be provided as required. The covers shall permit ready securing or opening and shall be watertight in flight.

3.7.1.6.4 RESCUE ENTRANCE IDENTIFICATION.

Each primary rescue entrance location shall be identified by arrows made of an adhesive material conforming to

SPEC MIL-R-13689. The arrow shall be orange yellow in color outlined with a $\frac{1}{4}$ inch black border for contrast with the word 'RESCUE' superimposed in 3 inch black letters.

3.7.1.7 EMERGENCY ESCAPE.

Emergency escape shall be provided for the crew. The means provided are primarily a function of the performance capabilities and mission profile of the rotary wing aircraft. All escape systems shall be completely compatible for crew members (lower limit 5 percentile man, upper limit 95 percentile man as specified in WADC Technical Report 52-321) with full personal flight gear (see 6.5.13).

3.7.1.7.1 MANUAL ESCAPE EXITS.

Manual escape exits shall be provided as necessary to permit ready and safe egress of rotary wing aircraft occupants in an emergency. All hatches, doors, windows, or ports, which are to be used as emergency escape exits, shall be quick opening, easily operable, and shall be jettisonable when in the fully closed position, the fully open position, and in any intermediate position between fully closed and fully open. Spring clips or similar devices shall be used in lieu of safety wire to preclude inadvertent actuation of emergency escape means. It shall be possible to operate release handles by a single motion of one hand or foot and by a force not exceeding 30 pounds.

In addition to being jettisonable, all escape hatches and doors that can be opened in flight shall have a hold-open lock of sufficient strength to prevent the closing of the hatch from gravity loads experienced during a survivable crash or ditching. A vertical deceleration force of 25g and a horizontal deceleration force of 20g shall be considered

as survivable. All escape hatches, doors, exits and areas shall be marked and identified in accordance with SPEC MIL-I-6142 except as herein modified. All areas marked for exit shall be so located that port and starboard locations are separated fore and aft by at least 4 feet, and shall provide adequate emergency exits in the event that all doors and 50 percent of the emergency exits are jammed closed. The number and size of the escape areas, assuming they are chopped through, shall permit evacuation of the rotary wing aircraft in 30 seconds. In determining the size and location of emergency exits, minimum interference with seats, litters, cargo, etc., shall be assumed in effecting an exit. Crash or ditching escape hatches shall be readily accessible by steps or ladder. Emergency escape exits and the immediate surrounding area shall be constructed to prevent fouling of clothing or gear. The minimum allowable sizes of escape exits shall be as follows:

(1) Bail-out escape hatches:

- (a) For side hatches—24 inches wide by 31 inches high (with rounded corners)
- (b) For belly hatches—24 inches wide by 29 inches long (with rounded corners)

(2) Crash or ditching escape hatches: All hatches—24 inches square (with rounded corners).

(3) Hoist (rescue) hatches—Same as (1) above.

3.7.1.8 WINDOWS AND PORTS.

The transparent construction employed in windows and ports shall be as approved by BUAER. Windows and

ports shall be watertight and mounted so that they may be replaced, preferably from the inside, without mutilation of the rotary wing aircraft covering or metal skin and so that they will not fail due to applied loads, distortion, or vibration of the rotary wing aircraft in service. Windows and ports shall be capable of being readily opened for purposes of ventilation, refueling, etc., when specified in the detail specification. Window guards shall be provided in Class HR and HU rotary wing aircraft to protect windows from damage by cargo. The guards shall permit cleaning of the windows from inside.

* * *

3.8.4.2 WHEELS.

Nosewheels shall be in accordance with SPEC MIL-W-5013.

3.8.4.3 CASINGS AND TUBES.

Nosewheels of helicopters shall be equipped with pneumatic casings and tubes or tubeless tires as specified in 3.8.2.3 with the size and ply ratings being based on the nose-wheel static load at the helicopter maximum gross takeoff weight.

3.8.4.4 SHOCK ABSORBERS.

Nosewheel shock absorber struts shall be in accordance with the applicable requirements specified in 3.8.2.4.

3.8.4.5 RETRACTING, EXTENDING AND LOCKING SYSTEM.

The requirements for nosewheel retraction, extension, and locking systems shall be as specified in 3.8.2.5.

3.8.4.6 DOORS AND FAIRINGS.

The requirements for nosewheel doors and fairings shall be as specified in 3.8.2.6.

3.8.4.7 BUMPER WHEEL OR SKID.

Bumper wheels or skids shall be provided as necessary. Skids shall be provided with a simple hardened surface replaceable shoe to absorb the wear and damage of impact.

3.8.5 AUXILIARY LANDING GEAR (OTHER)

3.8.5.1 DESCRIPTION.

Auxiliary landing gear other than nosewheel and tail-wheel shall be as specified in the detail specification.

3.9 ALIGHTING GEAR (WATER-TYPE).

Alighting gear, water-type shall be as specified in the detail specification.

3.10 FLIGHT CONTROL SYSTEMS.

Flight control systems shall be provided in accordance with SPEC MIL-F-18372 and shall meet the requirements of SPEC MIL-H-8501.

3.10.1 PRIMARY FLIGHT CONTROL SYSTEMS.

Primary flight control systems shall consist of the longitudinal control system, lateral control system, vertical control system, and directional control system.

3.10.1.1 FLIGHT CONTROLS.

Flight controls shall be provided for pilot and copilot and shall consist of the cyclic pitch sticks, collective pitch control levers (to the left of the pilots') and directional (rudder) pedals. The arrangement, location and actuation of controls and related items of equipment shall be in accordance with SPEC MIL-STD-250.

3.10.1.2 DIRECTIONAL CONTROL SYSTEM.

The directional control system shall be in accordance with SPEC MIL-F-18372.

3.10.1.3 STABILIZER SYSTEM.

The stabilizer system shall be in accordance with SPEC MIL-F-18372.

3.10.2 TRIM CONTROL SYSTEMS.

Trim control systems shall be in accordance with SPEC MIL-F-18372.

3.10.3 AUTOMATIC STABILIZATION EQUIPMENT.

When required by the detail specification, automatic stabilization equipment (Autopilot) shall be provided. The

design having the characteristics indicated below shall be subject to the approval of the Bureau of Aeronautics:

1. Maneuvering of the helicopter under automatic stabilization control shall resemble to the maximum extent practicable, the control characteristics of the basic helicopter. The combined characteristics of the trim system and automatic stabilization equipment shall be such that a force gradient is provided in pitch, roll, azimuth and altitude as follows:

The pitch and roll attitudes of the helicopter with respect to the trimmed attitude shall be proportional to and in the direction of the applied stick force.

The rate of yaw of the helicopter during maneuvers shall be proportional to the pedal force. When no force is applied the helicopter shall maintain the existing heading.

The rate of climb or descent of the helicopter shall be proportional to the applied collective stick force. When no force is applied the helicopter shall maintain the established altitude.

2. When under automatic control the helicopter shall be capable of maintaining the pitch and roll attitudes and heading established by the pilot under free air conditions in straight flight and coordinated turns.
3. The stabilization equipment shall be capable of restoring the aircraft to the preset attitude and heading after aerodynamic disturbances have occurred with not more than one overshoot.
4. The automatic stabilization equipment shall be capable of controlling the aircraft throughout its speed range, including hovering, and throughout its altitude range.

5. The automatic stabilization equipment shall be capable of maintaining the altitude of the helicopter within (plus or minus) 25 feet or (plus or minus) 5% of the altitude, whichever is greater, during straight unaccelerated flight, or when hovering out of ground effect when utilizing barometric altitude reference. When using radar altitude control the ASE shall be

* * *

DEFENDANT'S EXHIBIT 12

SD-552-1

DEPARTMENT OF THE NAVY
BUREAU OF NAVAL WEAPONS
(Illegible)

DETAIL SPECIFICATION

FOR

MODEL CH-53A HELICOPTER

CLASS CH

TWIN TURBINE ENGINE

(SEAL)

FINAL CORRECTED

Approved /s/ T Washington Jr.
Captain USN By direction

Date November 23, 1962

* * * * *

REVISED PAGE INDEX
CONTRACT DETAIL SPECIFICATION

Page No.	Para. No.	Rev. No.	ECP No.	Authorization	Description
1	1.1	R-4	6010	IBCC No. 41-438	Changed troop density from 30 to 38
1	1.1	R-8	6-10	IBCC No. 41-438	Noted effectivity as BuNo 151686 (3rd) and subsequent
1	1.1	R-17	6081	IBCC 61-868	Passengers Was 38 Now 37
1	1.1	R-18	6150	ACCB 71-710	Added alternate 6A or 6B engine
2	1.2.1	R-18	6089	ACCB 71-701	Changed weight and balance classification from class 1B to class 2
2	2.3	R-12	—	—	Added paragraph "Changes" to provide ready-reference accountability of currently authorized CH-53A changes
3	3.1.1	R-8	6026	IBCC No. 51-448	In top and middle drawings, changed diameter of main rotor systems from 72.0 feet to 72 feet, 2.70 inches

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3	3.1.1	R-8	6026	IBCC No. 51-448	In bottom drawing, changed length of rotors operating from 88.1 to 88.2 feet and changed length with main blades and pylon stowed from 56.5 to 56.6 feet.
3	3.1.1	R-16	6047R	ACCB 71-366	Revised maximum height tail folded dimensions
3	3.1.1	R-16	6085	ACCB 71-330 ACCB 81-310	Changed dimensions and added main rotor dome
4	3.1.2.1	R-9	6014R	IBCC No. 51-269	In the opening statement, after "as follows:" added: "or as limited by paragraph 3.28.1.2 of the engine model specification"
4	3.1.2.1 Note 2	R-9	6014R	IBCC No. 51-269	Changed from "1057A of 1 September 1961" to "E-1057B of 29 April 1963"
4	3.1.2.1 Note 2	R-18	6150	ACCB 71-710	Added alternate T64-GE-6A or 6B engine and changed engine spec. to E-1057C of 16 September 1966
5	3.1.3.2.2 and 3.1.3.2.12	R-4	6010	IBCC No. 41-438	Changed troop density from 30 to 38

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MODEL: CH-53A
SPEC: SD-552-1

Rev. No. R-17
Date: 9-27-68

Page No.	Para. No.	Rev. No.	ECP No.	Authorization	Description
5	3.1.3.2.2 & 3.1.3.2.12	R-8	6010	IBCC 41-438	Noted effectivity as BuNo 151686 (3rd) and subsequent.
5	3.1.3.2.2 & 3.1.3.2.12	R-17	6081	IBCC 61-868	Passengers Was 38 Now 37
5	3.1.3.2.6	R-16	6113	ACCB 71-849	Added Armament requirement.
6	3.1.3.2.12	R-5 R-11	6015	IBCC 41-633	Increased Engine Oil Tank Capacity for BuNo 151686 (3rd) and subsequent.
7	3.1.5	R-8	6026	IBCC 51-448	Changed Main Rotor Disc area from 4071.5 to 4097 square feet.
7	3.1.6	R-8	6026	IBCC 51-448	Changed Main Rotor (Blades) True Diameter from 72 feet to 72.0 feet, 2.70 inches.
8	3.1.6	R-8	6026	IBCC 51-448	Changed Span, Maximum Blades Rotating from 72 feet to 72.0 feet, 2.70 inches.
8	3.1.6	R-8	6026	IBCC 51-448	Changed length: Maximum Rotor Blades Extended (Rotating) from 88.46 feet to 88.2 feet.

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8	3.1.6	R-16	6047R	IBCC 71-366	Revised maximum height tail folded dimensions.
8	3.1.6	R-16	6085	ACCB 71-330 ACCB 81-310	Revised maximum height tail folded dimensions.
9	3.1.7	R-17	6193	ACCB 81-150	Revised cyclic control stick, lateral dimension.
9	3.2.1(2)	R-4	6010	IBCC 41-438	Changed cabin occupancy to show increase in troop density.
9	3.2.1(1)	R-17	6081	IBCC 61-868	Revised last sentence.
9	3.2.1(2)	R-8	6010	IBCC 41-438	Noted effectivity as BuNo 151686 (3rd) and subsequent.
14 & 14a	3.2.6	R-17	6096	IBCC 61-890	Changed topcoat paint in transmission cavity to epoxy type.
14	3.2.6	R-17	6187	ACCB 71-787	Last sentence "Was GFE Now CFE"
14	3.2.6.2	R-10	—	IBCC 61-119	Changed from "Applicable" to "Applicable except that #37038 paint, camouflage dull black may be used in the cockpit."
14	3.2.7.2.1	R-10	-	IBCC 61-119	Changed from "Applicable" to "Applicable except that lettering may be 1/8-inch high and numerals 3/16-inch high.
14	3.2.7.3	R-14 (Record)	6162	ACCB 71-159	Defined Identification Procedure.

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Page No.	Para. No.	Rev. No.	ECP No.	Authorization	Description
15	3.2.17	R-16	6047R	IBCC 71-366	Defined Maximum Height
15	3.2.17	R-16	6085	ACCB 71-330 ACCB 81-310	Defined Maximum Height
18	3.4d(2)	R-9	6037	IBCC 51-828	Added: "The foregoing is based on the use of MIL-L-7808D oil in the transmission system. (See paragraph 3.12.15.)"
19 & 19a	3.4.1.1	R-10	6049 & 6049 Supp. #1	IBCC No. 61-221	Amends certain applicable paragraphs of Spec MIL-8-8698(ASG) to provide a more detailed definition of the loading conditions influencing the primary structure of the Model CH-53A helicopter.
22	3.4.7(b)	R-17	6081	IBCC 61-868	Deleted and Heli-Team Leader's
24	3.5.1.2	R-8	6026	IBCC No. 51-448	Changed material call-out of alloy steel for root fitting to titanium.
24	3.5.1.2	R-16	6140	ACCB 71-1016	Added Abrasion Strip Requirement
26	3.6.2.1	R-2	6007	IBCC No. N682	Added a manually operated pylon folding system.
26	3.6.2.1	R-8	6007	IBCC No. 51-449	Noted effectivity as 151613 (1st), 151614 (2nd), 151686 (3rd) thru 151701 (18th).

26 3.6.2.1 R-11 — * Deleted note which limited effectivity to 1st, 2nd, and 3rd thru 18th A/C only.

* Authorized by negotiated contract document covering subsequent option(s).

26a 3.7.1.3.1.1 R-14 (Record) ACCB 71-159 Defined Positioning of V.G.I. Switch Panel Lights and Panel Mounts

27 3.7.1.4 R-16 6138 ACCB 319R1 Defined Dam requirement

27 3.7.1.6 R-12 6033 IBCC No. 51-70 Deleted reference to "rescuer and/or rescuer picked up by the rescue hoist."

27 3.7.1.6.1 R-10 6071R IBCC No. 61-119 Changed first sentence from "Applicable" to "Applicable except that a lock and key for locking the door from the outside shall not be provided."

27 3.7.1.6 R-18 6086 Supp. 1 Deleted Fold-Up Step between cabin and cockpit.

Page No.	Para. No.	Rev. No.	ECP No.	Authorization	Description
27	3.7.1.6.4	R-14	(Record) 6162	ACCB 71-159	Defined Method of Rescue Marking Identification.
28	3.7.1.7.1	R-3	6013	IBCC No. 41-230	Revised cabin manual escape windows.
28	3.7.1.8	R-1	6004	IBCC No. N624	Revised cockpit side windows with vent panels to fully openable hinged windows.
28	3.7.1.8	R-14	(Record) 6162	ACCB 71-259	Shown that Window Guards shall not be provided.
28	3.7.1.8	R-15	6111	ACCB 71-740	Shown Pilot and Co-pilot Escape Window Improvements.
29 & 29a	3.8.4.7	R-12	6082 & Supp. #1	IBCC No. 61-867	Added requirement for electrically-operated tail skid for 3rd & sub A/C.
31	3.10.3.1(a)	R-17	6109 & 51	ACCB 81-517	Revised Last Sentence.
32	3.10.3.1(a)	R-17	6109 & 51	ACCB 81-517	Revised Last Sentence.
32	3.10.3.2	R-13	6061	IBCC 61-679; (See SA ltr CS-4619 dtd 5-19-66 to NASC Attn. NPCA-32)	Incorporation of an Electronic ON-ON AFCS Configuration.
33	3.11.1	R-4	6005	IBCC No. 41-181	Changed removability of engine and engine nose gear box.

33	3.12.1	R-9	6014R	IBCC No. 51-269	Changed from "E-1057A, dated 1 September 1961" to "E-1057B dated 29 April 1963, except as noted in paragraphs 3.12.6.1 and 3.12.8.4 herein."
33	3.12.2.2	R-18	6150	ACCB 71-710	Added alternate 6A or 6B engine and added reference to Item 4 of Appendices in lieu of engine specification.
34	3.12.2.2	R-9	6014R	IBCC No. 51-269	Changed "E-1057-A" to "E-1057B"
34	3.12.2.2	R-18	6150	ACCB 71-710	Added reference to Item 4 of Appendices in lieu of engine specification.
34	3.12.4.5	R-17	6180	ACCB 81-365	Described the Flexible Driveshaft Pad.
35	3.12.5.2.2	R-16	6139	ACCB 71-309	Added EAPS Requirement.

* * *

SD-552-1

Rev. No. R-15

Date: 11-7-67

3.6.1.3 BLADE RESTRAINER.—Applicable.

3.6.2 TAIL GROUP

3.6.2.1 DESCRIPTION.—The tail group shall consist of the stabilizer and fin (pylon). A fully automatic, power-operated tail pylon folding system shall be provided. A manually-operated pylon folding system shall also be provided. Controls shall be provided convenient to the pilot or copilot. In addition, a control shall be provided in the aft portion of the helicopter for use by the crew chief. A suitable tail-lock warning device shall be provided. Visual indication of locking of critical components shall be provided.

3.6.2.2 STABILIZER.—Applicable.

3.6.2.3 ELEVATORS.—Not required.

3.6.2.4 FINS.—The vertical tail pylon shall act as a fin.

3.6.2.5 RUDDERS.—Not applicable.

3.6.2.6 ELEVATOR AND RUDDER STOPS.—Not applicable.

3.6.2.7 ARTIFICIAL TRIM.—Not applicable.

3.7 BODY GROUP.—The body group shall consist of the fuselage.

3.7.1. FUSELAGE.

3.7.1.1 DESCRIPTION.—The fuselage shall include all crew and personnel stations, cargo compartment and equipment compartments.

3.7.1.2 CONSTRUCTION.—The fuselage primary structure shall be of aluminum-alloy semi-monocoque construction. Stainless steel or titanium shall be used for fire isolation where necessary. The supports for the engine and/or transmission may be of steel construction. The fuselage section, up to W.L. 133 and including lower halves of personnel door and rear door-ramp, shall be of watertight construction. The sponsons, exclusive of main landing gear retraction wells, shall also be sealed for watertightness.

3.7.1.3 CREW AND PERSONNEL STATIONS.—Applicable.

3.7.1.3.1 PILOTS' COCKPIT.—Applicable. MIL-STD-250A and drawing MS33575 shall apply as approved by the Mock-up Board.

* * *

DEFENDANT'S EXHIBIT 13

SD-552-1-3

DEPARTMENT OF THE NAVY
NAVAL AIR SYSTEMS COMMAND

WASHINGTON, D.C. 20360

DETAIL SPECIFICATION
FOR
MODEL CH-53D HELICOPTER
FISCAL YEAR 1969

(SEAL)

THIS DOCUMENT IS THE PROPERTY OF UNITED AIRCRAFT CORPORATION AND IS DELIVERED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE DISCLOSED, REPRODUCED IN WHOLE OR IN PART, OR USED FOR MANUFACTURE FOR ANYONE OTHER THAN UNITED AIRCRAFT CORPORATION WITHOUT ITS WRITTEN CONSENT; AND THAT NO RIGHT IS GRANTED TO DISCLOSE OR SO USE ANY INFORMATION CONTAINED IN SAID DOCUMENT. THIS RESTRICTION DOES NOT LIMIT THE RIGHT TO USE INFORMATION OBTAINED FROM ANOTHER SOURCE.

APPROVED J.B. SHAFFER
CAPT., USN

DATE 12 July 1968 By direction

* * *

SD-552-1-3

3.7 BODY GROUP—The body group shall consist of the fuselage.

3.7.1 FUSELAGE

3.7.1.1 DESCRIPTION—The fuselage shall include all crew and personnel stations, cargo compartment and equipment compartments.

3.7.1.2 CONSTRUCTION—The fuselage primary structure shall be of aluminum-alloy semi-monocoque construction. Stainless steel or titanium shall be use for fire isolation where necessary. Titanium fittings shall be used for engine supports, and aluminum forgings for transmission supports. The fuselage section, up to W.L. 133 and including lower halves of personnel door and rear door-ramp, shall be of watertight construction. The sponsons, exclusive of main landing gear retraction wells, shall also be sealed for watertightness.

3.7.1.3 CREW AND PERSONNEL STATIONS—Applicable.

3.7.1.3.1 PILOTS' COCKPIT—Applicable. MIL-STD-250A and drawing MS33575 shall apply as approved for the prototype.

3.7.1.3.1.1 COCKPIT AND CABIN ENCLOSURES—Applicable except that the V.G.I. switch and the instrument panel lights and light mounts shall be approved as positioned; the V.G.I. transfer switch shall be approximately 12 inches from the magnetic compass, and the instrument panel lights and light mounts shall be approximately 6 inches from the stand-by magnetic compass.

3.7.1.3.1.1.1 COCKPIT ENCLOSURES—Not applicable.

3.7.1.3.1.1.2 CABIN ENCLOSURES—Applicable.

3.7.1.3.1.2 WINDSHIELDS—Applicable, except delete the last two sentences and substitute: "The transparent windshield material may be special surface process laminated plastic as approved for the prototype".

3.7.1.3.1.3 VISION—Applicable.

3.7.1.3.2 OTHER CREW STATIONS—A station for the crew chief shall be provided in the cabin forward of the main entrance door and a station for the heli-team leader shall be provided in the cockpit adjacent to pilot and copilot.

3.7.1.3.3 PASSENGER STATIONS—See 3.19.1.1.4.

* * *

SD-552-1-3

3.7.1.7 EMERGENCY ESCAPE—Emergency escape shall be provided for pilot and copilot through both cockpit side windows which shall be readily jettisonable. Both internal and external handles shall be provided to actuate the release mechanism. The handles of the release mechanism shall be so located, shaped and provided with detents as to prevent inadvertent actuation.

3.7.1.7.1 MANUAL ESCAPE EXITS—Manual escape exits shall be provided to permit egress of cabin occupants in an emergency. Emergency exits shall be provided by means of the main entrance door, the rear door-ramp, and one (1) emergency side hatch window equipped with internal and external release handles located in the forward portion of the cabin opposite the main entrance door. The upper portion of the main door and a window in the upper portion of the rear door-ramp shall be jettisonable. In addition, six (6) windows, three (3) on each side, shall also be provided for emergency escape and/or rescue entrance.

3.7.1.8 WINDOWS AND PORTS—Applicable except window guards shall not be provided. Approved nonflammable transparent plastic sheet shall be used. Lower cockpit windows shall be designed to withstand water loads. windows shall be located as follows:

COCKPIT—One on each side, one above and two below each of the pilot's and copilot's stations. The cockpit side windows shall be hinged for on-ground ventilation. The cockpit side windows shall be equipped with a locking mechanism to permit pilot/copilot visual indication of window locking in the closed position.

3.7.1.9 FLOORING (GENERAL REQUIREMENTS)—Applicable.

3.7.1.10 WORK PLATFORMS—Integral work platforms shall be provided to permit necessary maintenance by personnel on a rolling deck. They shall be operable with blades folded and unfolded. The forward sponson work platform shall have provisions for locking in both the open and closed positions. The main transmission work platform shall have provisions for locking in the closed position only.

3.7.2 BOOM(S)—Not applicable.

* * *

DEFENDANT'S EXHIBIT 14

TS-156

A. N. MILLER--COPY #46
DEPARTMENT OF THE NAVY
BUREAU OF NAVAL WEAPONS
WASHINGTON 25, D. C.

SECURITY CLASSIFICATION
CANCELLED CONF. CHANGED TO UNCL.
BY AUTHORITY (Illegible)
(Illegible)

BY Dorothy Mozelecky DATE CHANGED May 22, 1961
EMPLOYEE'S NAME

TYPE SPECIFICATION
FOR
ASSAULT TRANSPORT HELICOPTER
H-H (X)
(SEAL)

NOTICE—This document contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, U. S. C., Sections 793 and 794. The transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

APPROVED (Illegible)

By direction

DATE January 30, 1962

RECORDED BY CONTRACT STATION
ON 30/1/62 MK

REGISTRATION NO. 62-161

CONFIDENTIAL

* * *

TS-156

TYPE SPECIFICATION
FOR
ASSAULT TRANSPORT HELICOPTER
H-H (X)

1. SCOPE

1.1 SCOPE.—This type specification covers the essential requirements for the design of a multi-engine assault transport helicopter which shall be reliable, easily maintainable, and capable of performing the mission specified in 1.1.1.

1.1.1 MISSION.—This helicopter will be employed primarily in the movement of cargo and equipment, and secondarily in the transportation of troops, in the amphibious assault and subsequent operations ashore.

1.1.2 SYSTEM CONCEPT.—This helicopter shall assist in providing Marine ground combat units with the capabilities of rapidly concentrating forces and fire-power with maximum effectiveness in a wide range of limited war situations or in the event of general conflict.

1.1.3 MAJOR FEATURES.—This helicopter shall be capable of prosecuting singly or in conjunction with other forces, the vertical assault transport mission and other assigned tasks in all-weather conditions, day and night, in any geographic environment. The dimensional characteristics of the aircraft in a stowage condition shall be compatible with the LPH-2 and LPH-4 class carrier elevators and hangar deck clearance requirements. Elevator sizes and capacities are:

	LPH-2	LPH-4
Deck edge (2)	50' x 34'	(1) 60' x 34'
	35,000#	30,000#

Center line (2) 48' x44'
28,000#

Note: Minimum clearance of 12 inches required when spotted on the elevators; 18 inches desired.

1.1.4 SPECIAL FEATURES.—The special features are as follows:

- (1) An interim doppler navigation system shall be installed. An accurate navigation system (GFE) with emphasis on miniaturization and light weight design is required and will be developed for future installation.

TS-156

1.1.4 (Cont)

- (2) Adequate communication facilities must be provided to insure effective coordination with other elements of the amphibious force, other United States Military Services and NATO countries.
- (3) This helicopter shall be designed to insure ease of maintenance, routine checks, and changes of major components.
- (4) It is contemplated that this helicopter will be required to operate from:
 - (a) Established airfields with adequate maintenance and logistic facilities.
 - (b) Carriers of the LPH-2 and LPH-4 (CVC) classes with adequate maintenance and logistic facilities.

- (c) Advanced bases, areas or ships with individual platforms or limited landing storage facilities and limited maintenance and logistic support.
- (d) Areas ranging from arctic to tropic in all weather conditions.
- (5) Power rotor blade folding and unfolding is required. Folding and unfolding and starting and stopping shall be accomplished in winds up to 45 knots.
- (6) Automatic flight control is desirable to reduce pilot fatigue and to insure more effective prosecution of the mission. The helicopter, however, must be controllable in all flight regimes in the event of failure of any single automatic flight control equipment component so that the mission need not be aborted.
- (7) An external cargo hook-up shall be provided. This system must not require ground personnel to effect hook-up or release of externally carried cargo.
- (8) This helicopter shall be designed to incorporate rear-ramp loading which must accommodate entry of wheeled vehicles and standard pallet loads. An integral cargo handling system to expedite loading and unloading shall be provided.
- (9) Wheel type landing gear for landing and take-off and for easy and efficient deck handling shall be provided.
- (10) An emergency water landing and take-off capability shall be provided to lessen the probability of

loss of the helicopter in the event of an emergency landing at sea.

TS-156

1.1.4 (Cont)

- (11) Provision shall be made for single point pressure and gravity refueling with engines and rotors in operation.

1.2.1 WEIGHT AND BALANCE CLASSIFICATION.—Classification for weight and balance purposes is defined in Spec MIL-W-25140.

2. APPLICABLE DOCUMENTS.—General Specification SD-24H, Volume II dated 13 March 1959, forms a part of this type specification and shall be followed where applicable, except as otherwise specifically stated herein (see 6.3.4) and except that superseded publications shall not be used (see 2.1).

2.1 EFFECTIVITY OF DOCUMENTS.—Applicable publications shall be those contained in the LIST OF SPECIFICATIONS AND STANDARDS (Book Form) APPROVED BY THE BUREAU OF NAVAL WEAPONS, NAVWEPS 00-25-544, dated July 1961 and the LIST OF STANDARD DRAWINGS USED BY THE BUREAU OF NAVAL WEAPONS, NAVWEPS 00-25-543, dated October 1961. Other applicable publications not contained in the above lists shall be the issue in effect on 1 Jan 1962.

3. REQUIREMENTS

3.1 CHARACTERISTICS.—The characteristics contained herein are considered reasonable for this helicopter and shall be equalled or if possible, bettered.

3.1.2.1 GUARANTEED TABULATED PERFORMANCE.—The guaranteed performance shall be stated by the bidder. The desired performance is as follows:

V _{max} , military rated power, sea level, take-off gross weight. (not less than) knots	160
V _{eruse} , sea-level, take-off gross weight, not greater than normal rated power, no undesirable characteristics. (not less than) knots	150
Hover ceiling, take-off gross weight, out of ground effect, military rated power (not less than) feet	6000
Radius (see note 3) (not less than) N.Mi.	100
Rate of Climb, take-off gross weight, one engine inoperative, military rated power on remaining engine, sea level, 89.6°F, zero yaw (not less than) feet/min	100

* * *

DEFENDANT'S EXHIBIT 15
DEPARTMENT OF THE NAVY
Bureau Of Naval Weapons
Washington 25, D. C.
DEMONSTRATION REQUIREMENTS
FOR
CH-53A(H-H(X)) HELICOPTER
(SEAL)

Approved J Hedrick
Captain, USN

By direction

Date December 11, 1962

1. SCOPE

1.1 SCOPE.—This specification covers the requirements of the Bureau of Naval Weapons (BUWEPS) for the demonstration of the CH-53A helicopter. The expression "demonstration" refers to any of the contractor's work specified herein including modifications contained in pertinent contractual documents.

1.1.1 CORRELATIVE PROVISIONS

1.1.1.1 GOVERNMENT RESPONSIBILITIES.—This document, in addition to governing contractors' demonstration work, delineates certain responsibilities of Government officers concerning such work, and sets forth policy of the Chief of BUWEPS on release for flight and on restrictions to be observed in subsequent operations.

1.1.1.2 PERFORMANCE AND DOCUMENTATION OF CERTAIN TESTS.—Certain demonstration tests when properly performed and documented, eliminate the need for related tests by the Board of Inspection and Survey (BIS) and thus shorten the period otherwise required for trials.

1.1.1.3 POLICY FOR COORDINATION OF TEST AND EVALUATION.—"It is the policy of the Bureau of Naval Weapons to assign the responsibility for coordinating the demonstration of naval aircraft to the Commander, Naval Air Test Center. Such phases of the demonstrations as fall within the purview of other activities will be assigned thereto by the Naval Air Test Center. Likewise in the case of other test and evaluation projects assigned directly to COMNAVAIRTESTCEN by the Bureau of Naval Weapons, he is authorized to assign portions or phases of these projects to other BUWEPS field activities at his discretion. These activities will report the results of such demonstrations, tests or evaluations to the Commander, Naval Air Test Center who retains the over-all reporting responsibility to the Bureau of Naval Weapons".

1.1.1.4 POLICY ON RELEASE OF NAVAL AIRCRAFT FOR TRIALS AND FLEET USE.—BUWEPS Instruction 13100.4 contains the policy of BUWEPS concerning the release of naval aircraft for BIS Trials and for use by the Fleet.

1.2 PURPOSE OF DEMONSTRATION.—The primary purposes of demonstrations are:

- (1) To determine that the helicopter can be safely operated by Navy pilots during trials to limits consistent with the contract design limits for the helicopter;
- (2) To obtain early basic information regarding the military potential of new models of helicopters and the operability of all their equipment;
- (3) To permit early decisions regarding attainment of superior characteristics;
- (4) To obtain quantitative information on safe limits for operation by Fleet pilots; and

- (5) To show that the specified demonstration tests can be performed without occurrence of yielding, excessive wear, malfunction, or failure of components of the helicopter.

1.3 DURATION OF DEMONSTRATION.—The demonstration begins with the first contract work performed by the contractor in compliance with provisions of this specification (i.e., submittal of demonstration planning information, preparation of a helicopter for demonstration, or conference with representatives of the Government concerning actual details of the specified demonstration, whichever occurs first) and ends with satisfactory completion by the contractor of all specified tests of all required reports and data, and acceptance by Government of all reports and data concerning the demonstration that are required to be submitted for acceptance.

2. APPLICABLE DOCUMENTS

2.1 EFFECTIVE DATES OF DOCUMENTS.—The effective dates of documents referred to herein shall be as specified in applicable contract detail specifications for the demonstration helicopters.

2.1.1 SPECIFICATIONS AND STANDARDS.—The following specifications and standards form a part of this specification to the extent specified herein:

SPECIFICATIONS AND STANDARDS MILITARY

MIL-I-5072	Instrument Systems; Pilot-Static Tube operated, Installation of
MIL-E-5400(ASG)	Electronic Equipment, Aircraft, General Specification for
MIL-T-5422(ASG)	Testing, environmental, Aircraft Electronic Equipment

MIL-T-5522	Test Procedure for Aircraft Hydraulic and Pneumatic Systems, General
MIL-T-5842	Transparent Areas, Anti-icing, Defrosting and Defogging Systems, General Specification for
MIL-T-5955	Transmission Systems, Helicopter, General Requirements for
MIL-I-6051	Interference Limits and Methods of Measurement; Aircraft Radio and Electronic Installations

2.1.1 (Cont)

SPECIFICATIONS AND STANDARDS MILITARY

MIL-E-6059	Engines, Aircraft Processes for Corrosion Protection, Pre-Oiling and Ground Operation of
MIL-I-6115	Instrument Systems; Pilot Tube and Flush Static Port Operated, Installation of
MIL-D-6728	Dampers, Engine Exhaust Flame and Glare
MIL-D-7006(ASG)	Detecting Systems; Aircraft, Fire (Installation and Test of)
MIL-E-7080	Electrical Equipment; Piloted Aircraft Installation and Selection of, General Specification
MIL-M-7700	Manuals; Flight
MIL-C-7762	Compasses, Installation of

MIL-A-7772(ASG)	Antenna Systems, Airborne; General Specification for the Design, Location and Installation of
MIL-C-7940	Gages, Fuel Quantity, Capacitor Type, Installation and Calibration of
MIL-H-8501A	Helicopter Flying Qualities, Requirements for
MIL-A-8591(ASG)	Airborne Stores and Associated Suspension Equipment, General Design Criteria for
MIL-I-8671(Aer)	Installation of droppable stores and associated release systems
MIL-I-8672	Installation of Aircraft Pyrotechnic Equipment
MIL-C-8678 (Aer)	Cooling Requirements of Power Plant Installation
MIL-T-8679	Test Requirements, Ground, Helicopter
MIL-I-8683(Aer)	Installation of Oxygen Equipment in Aircraft
MIL-S-8698(ASG)	Structural Design Requirements; Helicopters
MIL-D-8706A(WEP)	Data, Design, Contract Requirements for Aircraft
MIL-D-8804	De-Icing System, Pneumatic Boot, Aircraft General Specification for
MIL-A-8806(ASG)	Acoustical Noise Level in Aircraft; General Specification for

MIL-F-17874	Fuel Systems, Aircraft Installation and Test for
MIL-I-18079(Aer)	Installation of Angle of Attack and Sideslip Systems
MIL-R-18136(Aer)	Reports, Format and General Requirements
MIL-H-18325(Aer)	Heating and Ventilating Systems, Aircraft General Specification for
MIL-I-18370(Aer)	Installation of Mechanically Ejected Life Rafts in naval aircraft
MIL-F-18372(Aer)	Flight Control Systems: Design, Installation and Test of, Aircraft
MIL-T-18606(Aer)	Test Procedures for Aircraft Cabin Pressurizing and Air Conditioning System
MIL-T-18607(Aer)	Thermal Anti-Icing Equipment, Wing and Empennage
MIL-T-18847(Aer)	Tank, Fuel, Aircraft, Auxiliary External, Design and Installation of

2.1.1 (Cont)

SPECIFICATIONS AND STANDARDS
MILITARY

MIL-I-19326(Aer)	Liquid Oxygen Equipment in Aircraft, General Spec. for Installation of
MIL-A-19736(Aer)	Air Refueling Systems, General Requirements for

MIL-O-19838(Aer)	Oil Systems, Aircraft, Installation and Test of
MIL-W-25140(ASG)	Weight and Balance Control Data
MIL-E-7016C(ASG)	Electrical Load and Power Source Capacity: Analysis of: Method for Aircraft

STANDARDS

MIL-STD-704	Electric Power, Aircraft, Characteristics and Utilization of
MIL-STD-800	Procedure for Carbon Monoxide Detection and Control in Aircraft

(When requesting specifications, refer to both title and number. Copies of this specification and applicable specifications may be obtained upon application to the Commanding Officer, Naval Aviation Supply Depot, 5801 Tabor Ave., Philadelphia 20, Pennsylvania, Attention Control Desk, Specifications).

2.1.2 PUBLICATIONS. — The following publications of the issue in effect on date of request for proposal, form a part of this specification to the extent specified herein.

BUWEPS INSTRUCTIONS

- 4420.4 Logistic Material Support of Aircraft Produced as Fleet Introduction Replacement Model Aircraft — Encl. 1
- 13900.1 Special flight-test instrumentation at the Naval Air Test Center, accountability, custody and replenishment of (Available for BUWEPS)

- 13100.4 Release of Naval Aircraft for Trials and Fleet Use; Policy Regarding
- 13100.5 Navy Contract Demonstration Requirements; administration of documentation stemming from and relating thereto
- 13100.6 MIL-D-8708A(Wep) and MIL-D-23222(Wep); Administration of

2.2 OTHER DOCUMENTS. — The following documents form a part of this specification. Unless otherwise indicated, the issue in effect on date of request for proposal shall apply.

2.2 (Cont)

National Aeronautics and Space Administration
Technical Report No. 1235

Standard Atmosphere — Tables and Data for altitudes to (Application for copies should be addressed to the Superintendent of Documents, Government Printing Officer, Washington 25, D.C.)

NAVAER-00-80R-30 dated 1959-Aeronautical Dictionary (G.P.O. Wash. 25, D.C.)

American Society of Mechanical Engineers

ASA Y10.7 — 1954 American Standard Letter Symbols for Aeronautical Sciences. (Copies of this ASME document may be obtained from American Society of Mechanical Engineers, West 39th St., New York, New York.)

Board of Inspection and Survey

BIS Aircraft Test Directive No. 1-4 of 3 May 1957 —
BIS Trials — Utilization of Data reported by

Contractors, Federal Aviation Agency, U.S. Air Force, or other sources.

U.S. Air Force

WADD Technical Report 52-321 (para. 3.17.17).

3. REQUIREMENTS

3.1 GENERAL

3.1.1 LOCATIONS FOR TESTS. — Throughout this specification, the expression "contractor's plant" refers to the contractor's flight-test facilities. Flight-test facilities other than the contractor's may be approved by COMNAVAIRTESTCEN for the particular demonstration tests. Unless such changes in locations for certain tests are so approved, all specified tests shall be performed at the contractor's plant except as follows:

- (1) Dives and pull-outs, flying qualities and performance and guarantees, and takeoff and landing tests shall be performed at the Naval Air Test Center.

3.1.2 TEST AUTHORITY. — For purposes of this specification, a "Test Authority" is defined as the applicable BUWEPSREP, or the commander of an activity or facility which is assigned by BUWEPS or by the Commander, Naval Air Test Center under the policy set forth in this specification, to conduct and witness demonstrations and tests required to be performed under the terms of the specification or other applicable documents. Test authorities shall witness or designate witnesses for the demonstrations and tests and shall approve instrumentation, data reduction procedures, and all test methods and procedures for which detailed methods and procedures are not specified

* * *

DEFENDANT'S EXHIBIT 16

MIL-D-8706A (WEPS)

22 May 1961

Superseding

MIL-D-8706 (AER)

20 April 1955

MILITARY SPECIFICATION DATA AND TESTS, ENGINEERING: CONTRACT REQUIREMENT FOR AIRCRAFT WEAPON SYSTEMS

This specification has been approved by the Bureau of Naval Weapons, Department of the Navy.

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FSC N/A

SIKORSKY AIRCRAFT LIBRARY

* * *

MIL-D-8706A (WEPS)

3.6.6 FINAL MISSILE LAUNCHING CHARACTERISTICS—The reports of 3.5.6.1 shall be revised to include all available pertinent aerodynamic test data for the aircraft missile(s) configurations and to show that the missile(s) can be successfully launched or jettisoned during the demonstration flights.

3.6.7 AERODYNAMIC HEATING DATA.—Required in accordance with 3.5.7 as necessary to make the

engineering data applicable to the aerodynamic heating investigations continued or extended under Phase II.

3.6.8 DESCRIPTIVE DATA REQUIRED WITH STABILITY AND CONTROL TEST AIRPLANES.

—A complete description of airplanes delivered to the Naval Air Test Center for stability and control tests (applies to BIS and contractor airplanes delivered for special PTR projects) shall be furnished. The description may vary for individual airplanes but shall include the following:

- (1) All external details of the airplane which might affect the flying qualities: slots, slats, boundary layer controls, flaps, spoilers, fences, vortex generators, external stores, etc., all shown on a three-view drawing of the airplane and on other sketches as required.
- (2) All pertinent details of the control systems; details of the type of control, aerodynamic and mass balance, gearing ratio, tabs, springs, bob-weights, mechanical advantage changes, preloads, etc., for manual controls. For complicated or unconventional systems a sketch of the system may be required. Details of the system including boost ratios, capacities and operating pressures are required for boosted systems. Details of the fuel and power systems are required for power control systems. The recommended settings of gain and follow-on should be included with a complete description of artificial stability devices.

3.6.9 MOCKUPS.—

(1) Aircraft Mockups.—Aircraft mockups shall be provided in accordance with Spec MIL-M-8650 and shall include submittal of the following: (Not required if furnished under Phase I)

(a) Mockup Photographs.—Photographs of approved mockups shall be furnished in accordance with Spec MIL-M-8650.

(2) Lighting Mockups.—Lighting mockups shall be provided in accordance with Spec MIL-M-8650 and shall include submittal of the following:

(a) Mockup Photographs.—Photographs of approved lighting mockups shall be furnished in accordance with Spec MIL-M-8650.

* * *

DEFENDANT'S EXHIBIT 18

84-0486-R

NOw 63-0150-f

* * *

SCHEDULE

CONTRACT NOW 63-0150-f

(g) The Contractor will include the provisions of the foregoing paragraphs (a) through (f) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the President's Committee on Equal Employment Opportunity issued pursuant to section 303 of Executive Order No. 10925 of March 6, 1961, so that such provisions will be binding upon each subcontractor or vendor.* The Contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

*The President's Committee on Equal Employment Opportunity interprets the first sentence of paragraph (g) to mean that the Contractor will include the provisions of the foregoing paragraphs (a) through (f) in every first-tier subcontract or purchase order, so that such provisions will be binding upon each such subcontractor or vendor, and will require each first-tier subcontractor or vendor

similarly to include the provisions of paragraphs (a) through (f) in any subcontract or purchase order which he places, unless exempted by rules, regulations, or orders of the President's Committee on Equal Employment Opportunity issued pursuant to section 303 of Executive Order 10925 of March 6, 1961.

P82-2F SECTION LL—ENGINEERING CHANGE PROCEDURE

Such proposal shall be submitted to the Chief, Bureau of Naval Weapons, via the cognizant field representative of this Bureau; and shall be submitted in accordance with any subsequent modification thereto, or superseding document, in effect and furnished to the Contractor prior to the date the ECP is submitted; provided however, that if any such document modification or superseding document affects the cost of performance of this contract, the contract price shall, pursuant to the procedures provided in the "Changes" clause, be equitably adjusted.

SCHEDULE

CONTRACT NOW 63-0150-f

P108 SECTION MM—REVISIONS OF GUARANTEES

If this contract calls for the furnishing of aircraft, change orders shall, when appropriate, include revisions of the guarantees set forth in the Section hereof entitled "Guarantees" and of such other terms and conditions hereof as may be affected by the change. When the effect of any change increases or decreases any item of performance specified in such section by less than 1% no revision of the corresponding guarantees will be made unless specifically requested by the Contracting Officer or the Con-

tractor. The Contractor shall, prior to beginning the demonstration, if any, required hereunder in accordance with the provisions of Specification MIL-D-8708(Aer) as modified by the applicable addendum thereto, submit a report covering proposed revisions, if any, of the guarantees as are deemed to be necessary by the Contractor on account of any change in engine rating, any overweight or underweight of Government-furnished Property, and the cumulative effect of changes not theretofore taken into account, which revisions upon acceptance by the Contracting Officer shall be set forth in an amendment to the contract. Detailed calculations shall be furnished by the Contractor to substantiate all proposed revisions of performance guarantees.

P109-1 SECTION NN—WEIGHT CONTROL

A system of weight control during design and construction, satisfactory to the Bureau of Naval Weapons Representative, shall be provided by the Contractor in accordance with Specification MIL-W-25140(ASG), dated 31 March 1955, or MIL-W-3947, dated 1 March 1955, whichever is applicable.

P110 SECTION OO—DESIGN RESPONSIBILITY

In releasing design data or drawings, or in releasing aircraft for flight, the Government accepts no responsibility for the successful operation of the equipment manufactured by the Contractor.

P111-1 SECTION PP—DEMONSTRATIONS

(a) In the event that this contract makes no provision in the Schedule for demonstrations of the aircraft procured hereunder, and in the event that the Contracting

Officer determines that a demonstration is necessary, the Contractor shall, when required in writing by the Contracting Officer, perform such demonstrations as the Contracting Officer may direct. Accordingly, in the event such demonstrations are required, the provisions of this contract shall be equitably adjusted, in accordance with the procedure of the "Changes" clause for any demonstrations which may be required by the Contracting Officer under this paragraph (a).

(b) Each aircraft, except the aircraft, if any, which shall have performed in its entirety the demonstration required in the Schedule or as may be required in accordance with the directions of the Contracting Officer issued pursuant to paragraph (a) above, shall be demonstrated by the Contractor prior to delivery by depreservation, if necessary, and ground test of the engines in accordance with Specification MIL-E-6059A, dated 25 February 1954, or Specification MIL-E-5595A, dated 7 July 1954, whichever may be applicable, as modified by mutual agreement of the Contracting Officer and the Contractor, and by flight test of not less than two hours duration (unless a shorter period is approved by the Bureau of Naval Weapons Representative) to insure proper alignment and satisfactory functioning of the aircraft concerned in the air.

P113-1-2 SECTION QQ—TRIALS (Alternate)
(Mod.)

(a) The Department of the Navy (Board of Inspection and Survey) shall conduct such trials of designated aircraft as may be considered necessary by the Department of the Navy for the purpose of determining whether or not the contract guarantees have been fulfilled and the air-

craft are satisfactory for service use. Trials conducted by the Board of Inspection and Survey shall be at Government expense. If the Contracting Officer requires the Contractor to furnish competent aircraft mechanics or technicians to service the aircraft undergoing trials or instrumentation for use in connection with the trials to be performed hereunder, the Contractor shall be reimbursed therefor in an amount to be negotiated by the Contractor and the Contracting Officer, and the contract price shall be equitably adjusted in accordance with the procedures of the "Changes" clause hereof. The term "instrumentation", for the purposes of this paragraph, shall be deemed to include, in whole or in part as directed by the Contracting Officer, the furnishing by the Contractor of (i) instruments; (ii) services required to install instruments; and (iii) services required to remove instruments. Upon the completion of trials, the Contracting Officer may, by written order, direct the Contractor to configure the aircraft to any existing contract specification applicable to aircraft under this contract and the contract price shall be equitably adjusted in an amount to be negotiated by the Contractor and the Contracting Officer pursuant to the procedure of the clause hereof entitled "Changes".

(b) The Government assumes all risk of loss of or damage to the aircraft performing trials in accordance with the provisions of paragraph (a) above and assumes all risk of loss of or damage to the Government-furnished Property installed therein, if such loss or damage occurs after such aircraft have been delivered by the Contractor to the Department of the Navy, at such place as the Bureau of Naval Weapons shall designate, for trials and before such aircraft have been either (i) redelivered to the Con-

tractor for the incorporation of changes in accordance with the provisions of this contract, or (ii) have been finally accepted by the Government, whichever event shall first occur; provided, however, that the obligation of the Contractor with respect to correction of defects shall be as specified in the "Correction of Defects" clause hereof. If such aircraft shall be damaged during the above-mentioned period of time, and if the Contracting Officer shall request the Contractor to repair such damage, the Contractor shall do so promptly, and shall be reimbursed therefor in an amount to be negotiated by the Contractor and the Contracting Officer. Failure to agree upon such amount shall be a dispute as to a question of fact within the meaning of the clause of this contract entitled "Disputes."

. . .

DEFENDANT'S EXHIBIT 20

CONTRACT

* * *

N00019-68-C-0471

SCHEDULE

F-4 ENGINEERING CHANGE PROCEDURE

(CLAUSE A)

(430-1) (FP)

Any Engineering Change Proposal (ECP) affecting an item being procured under this contract shall be submitted by the Contractor to the Chief, Bureau of Naval Weapons, via the local Government representative of this Bureau. Each Engineering Change Proposal (ECP) for a Class I change, and each change form for a proposed Class II change, affecting an item being procured under this contract shall be prepared and submitted in accordance with the provisions of Air Force-Navy Aeronautical Bulletin No. 445, entitled "Engineering Changes to Weapons, Systems, Equipments, and Facilities," dated 12 July 1963, and BUWEPS Supplement No. 1 thereto, revised 1 March 1966; and in accordance with any subsequent modification thereto, or superseding document ordered in writing by the Contracting Officer prior to the date the ECP is submitted. If any such document modification or superseding document is ordered and affects the cost of performance of this contract, the contract price shall, pursuant to the procedures provided in the "Changes" clause, be equitably adjusted.

For this contract, Class II changes shall be processed in accordance with paragraph 6.2.1 of BUWEPS Supplement No. 1.

F-5 RENT-FREE USE OF GOVERNMENT PRODUCTION AND RESEARCH PROPERTY

(439) (FP) (AIR)

Subject to the provisions of the clause of this contract entitled "Government Property," the Contractor is hereby authorized to use, on a rent-free basis, such Government production and research property as may be necessary for the performance of this contract and covered by Contract(s): NOW 6167-u and Special Tooling covered by Contracts NOW 63-0150-f, NOOO19-67-C-0401, NOOO19-68-C-0627 and Air Force Contract No. AF33657-68-C-1297. The price and delivery schedule set forth in this contract are based on the rent-free use of such property.

In the event the Contractor's authority to use such property is limited or terminated by the Government and such termination or limitation deprives the Contractor of the right to use such property which at or after the time of such limitation or termination are or will be required by the Contractor to perform this contract in accordance with the delivery schedule set forth herein, then an equitable adjustment in the price or delivery schedule, or both, shall be made in accordance with the provisions of the clause of this contract entitled "Changes," provided, however, that if the limitation or termination is due to failure by the Contractor to perform its obligations under such contracts(s), the Contractor shall be entitled only to such adjustment as the Contracting Officer in his opinion determines to be appropriate under the circumstances.

* * *

DEFENDANT'S EXHIBIT 22

NATOPS GENERAL FLIGHT AND OPERATING INSTRUCTIONS

OPNAV INSTRUCTION 3710.7K

DEPARTMENT OF THE NAVY
OFFICER AND CHIEF OF NAVAL OPERATIONS

* * *

passengers with the aeromedical aspect of flight and to prepare them for prompt and proper employment of emergency equipment and procedures.

b. THIS SHALL BE ACCOMPLISHED by a training program which covers the following specific areas: basic human physiology with emphasis on cardiovascular, respiratory, auditory, vestibular, visual, and musculoskeletal systems; environmental stresses including noise, heat, vibration, acceleration, disorientation, altitude, special weapons and systems; physical fitness, self-imposed stresses, and self-medication; egress training, aviation life support systems and their procedures. Commanding officers, aero physiologist, flight surgeons, training and safety officers shall monitor the program to assure responsiveness to the requirements of the operating forces and the Naval Training Command (NAVTRACOM). To assure maximum effectiveness, the NAPTP must be dynamic, current, and integrated with other training programs; Naval Aviation Water Survival Training Program (NAWSTP), simulator training, survival training, and first aid.

c. CNET will coordinate the training requirements of CMC, TYCOMS, CNATRA, and CNAVRES and submit the NAPTP curricula to CNO (Op-59) for approval, in accordance with OPNAVINST 1550.8. Curricula will be

developed for CNET by the ATNM for NAPTP based on the needs of CMC, TYCOMS, CNATRA, and CNARVES and with the technical advice of BUMED. Those CNO (Op-59) approved curricula will be provided to designated NAPTP training agents for implementation. Initial and refresher training shall be accomplished at naval and USAF aviation physiology training facilities approved by CNO (Op-59). BUMED shall designate the NAPTP training model manager.

* * *

e. EMERGENCY EGRESS TRAINING. Training in emergency egress shall include a lecture on basic principles, aeromedical aspects, associated equipment, and static and dynamic demonstrations as outlined below. Where available, appropriate maintenance and operator training equipment systems shall be utilized in addition to these training requirements.

(1) Dynamic ejection seat training at an Aviation Physiology Training facility shall be accomplished by flight personnel and passengers, initially, prior to flight in an aircraft equipped with ejection seat(s). Subsequent dynamic ejection seat training is strongly encouraged for all flight personnel returning to ejection seat equipped aircraft after prolonged absence; i.e., DIFDEN, illness, etc.

(2) Static ejection seat training shall be conducted as part of the regular refresher Naval Aviation Physiology Training Program, and when transitioning to an aircraft with a different type ejection system. Commanding officers shall ensure that interim static ejection seat/egress training is conducted annually utilizing local assets. Aerospace physiologists and/or flight

surgeons should participate in the annual static training in order to address the aeromedical aspects of ejection.

(3) Commanding officers shall insure that egress training for other than ejection seat equipped aircraft be conducted annually. Additionally, specific training shall be conducted for flight personnel in regards to assisting passengers.

f. PRESSURE SUIT INDOCTRINATION. Initial and refresher pressure suit indoctrination shall be accomplished at designated USAF physiology training facilities by all flight personnel prior to flight with such equipment. Pressure suit indoctrination does not satisfy the requirement for training specified in paragraph 731d. For those flight personnel assigned to units whose mission includes

* * *

DEFENDANT'S EXHIBIT 24

Form 209-S

TO: Mr. P. W. Holt

cc: Messrs: D. Anderson
R. S. Decker

The following aircraft were accepted by Military Pilots on 6-25-70 and were delivered from the Plant on 7-28-70.

<u>MODEL</u>	<u>S.A. NO.</u>	<u>CUSTOMER NO.</u>	<u>FOR</u>
CH-53D	65277	157151	USMC

/s/ F.Kondrost
for W. E. Kenna
Quality Control Manager

DEFENDANT'S EXHIBIT 31

84-0486-R

UNITED
TECHNOLOGIES
SIKORSKY
AIRCRAFT

Internal
Correspondence

To: T. Dixon

Fm: K. Wallischeck

Re: CH-53A/D Servo Valve Investigation

Dt: 3 June 83

As a result of the CH-53A alleged control problem at Norfolk, VA, we looked at and investigated some of the chip-shear characteristics of the Model 10 Moog dual input servo valve. Tests were performed on a P/N 65652-03177-105 (Moog P/N 10-121A) valve which is the unit used on CH-53 models on the roll AFCS servo.

I. Controls

During normal operation the CH-53 AFCS servos are supplied by a 1000 psi pressure source.

The lateral stick has a displacement of 8.87 inches (full left to full right). The mechanical advantages of the lateral stick to servo are:

- | | |
|----------------------------|-----------|
| a) Stick to power position | 4.43 to 1 |
| b) Stick to trim piston | 8.87 to 1 |
| c) Stick to valve input | 44.3 to 1 |

Spring rate data obtained 1981 from an in-service aircraft (in lbs/in) measured with a rigging block installed in the AFCS servo (p. piston).

	Pitch	Roll
Stick to servo	32	27
Lower broom closet to servo 5000		7850

This shows softest system is in the cockpit area. For the roll channel:

$$\frac{1}{KT} = \frac{1}{KC} + \frac{1}{KB} \quad - \quad \frac{1}{27} = \frac{1}{KC} + \frac{1}{7850}$$

Hence cockpit lateral control stiffness is 27.1 lbs/in. Each servo valve is connected to the control system through a shear joint consisting of a bushing retained by an aluminum alloy shear rivet. The joint is designed to shear between 600 and 1100 lbs force applied to the valve input. (600 lbs at min. material strength of rivet, 1100 lbs max. strength.) Related to the pilot it would require a stick force of 13.5 to 25 lbs to shear the joint. This could not be accomplished if the stick is within one inch or less of the stick stops due to system deflection.

The power piston area is .199 to .20 in². At stall this yields a 200 lb force. Reaction force of the pilot to overcome this force is 45 lbs. To reverse the direction of a hardover motion requires the pilot to also overcome the servo frictional forces, which are approximately 40 lbs (system pressurized). This results in a pilot effort of about 55 lbs to overcome a hardover. Deflection again will result in loss of about 2 inches of control motion, or a 22 percent loss of control range.

II. Servo Valve

The Model 10 servo valve has a spool diameter of .250/.260 in. Spool to sleeve clearance is stated by Moog

to be 0.000150 to 0.000170 inches. Actual clearance measured on the accident aircraft part was .0001000 in. Slot width for the -105 valve is .018 inch. The hydraulic force available to shear contamination is a function of the supply pressure and the pressure recovery of the first stage of the valve. Typical pressure recovery of flapper nozzle type valves is 70 to 80 percent. Using the lower value and 1000 psi supply results in 700 psi acting on the .051 in² valve area, yielding a 35 lb chip shear force.

The mechanical force available is a function of the linkage ratio. In the lateral channel a one lb force yields a 44.3 lb force at the valve input.

III. Chip Shear Test

The suspect chip found in the accident A/C valve measured (in inches) .080 long, .013 wide, .0005 thick. Composition 1010 series steel.

To simulate the chip, standard steel shim stock was obtained. The min. thickness available was 0.0001 inch (twice the chip thickness). Strips of varying width were cut from the shim stock and inserted into the valve slot. The spool was then forced via a spring scale against the obstruction until the chip sheared. The max. force required was recorded. In addition a .018 in thick carbon steel wire was inserted into the valve ports and shear force values obtained. Attempts to jam shim stock into the clearance between the spool and sleeve failed even when shim sliver was inserted at the sleeve and lead-in chamfer. In each instance the obstruction was sheared.

Tests results:

<u>Condition</u>	<u>Force (in lbs)</u>
.001 shim stock in metering port	1.1 to 1.25 (several pieces)
.001 s. stock max. width (.018)	1.3
.0015 s. stock fed into large cyl. port	1.75
.001 s. stock wedged into sleeve end	7.75
.018 wire (metering slot)	10 (consistent)
.018 wire double shear in cyl. port	20

Conclusions

- The dimensions of the chip found in the servo valve preclude it from entering the clearance between the sleeve and spool by a 5:1 margin.
- The maximum width contaminant that can lodge in the metering slot is .018 in. Tests have shown that the shear force necessary to cut that size are too small to be of any consequence.
- Any contaminant lodged in the much larger cylinder ports are of no concern since no valve land sweeps this area during any stage of valve operation.
- The actual chip dimension indicates a shear requirement of less than 1 lb.
- A 55 lb force at the stick can overcome a hardover servo.
- A 25 lb force at the stick should have broken the shear pin at the valve input if the valve was jammed. (Actual shear values established by NARF).
- No fact or scenario can be established which can tie the chip found in the valve to the cause of the reported control malfunction.

/s/ Kenalinslid
KW/st

(Private)

DEFENDANT'S EXHIBIT 33



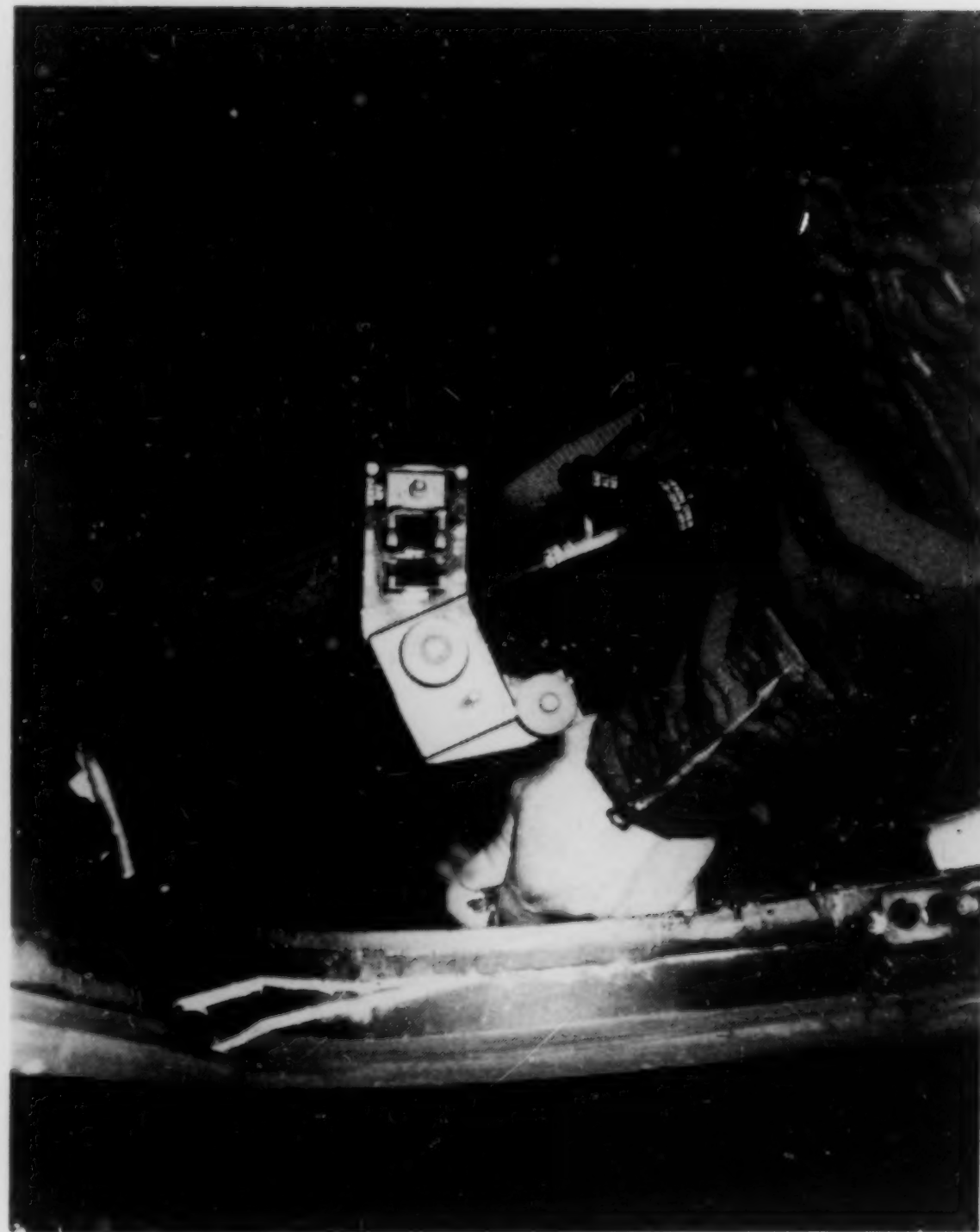
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DEFENDANT'S EXHIBIT 37



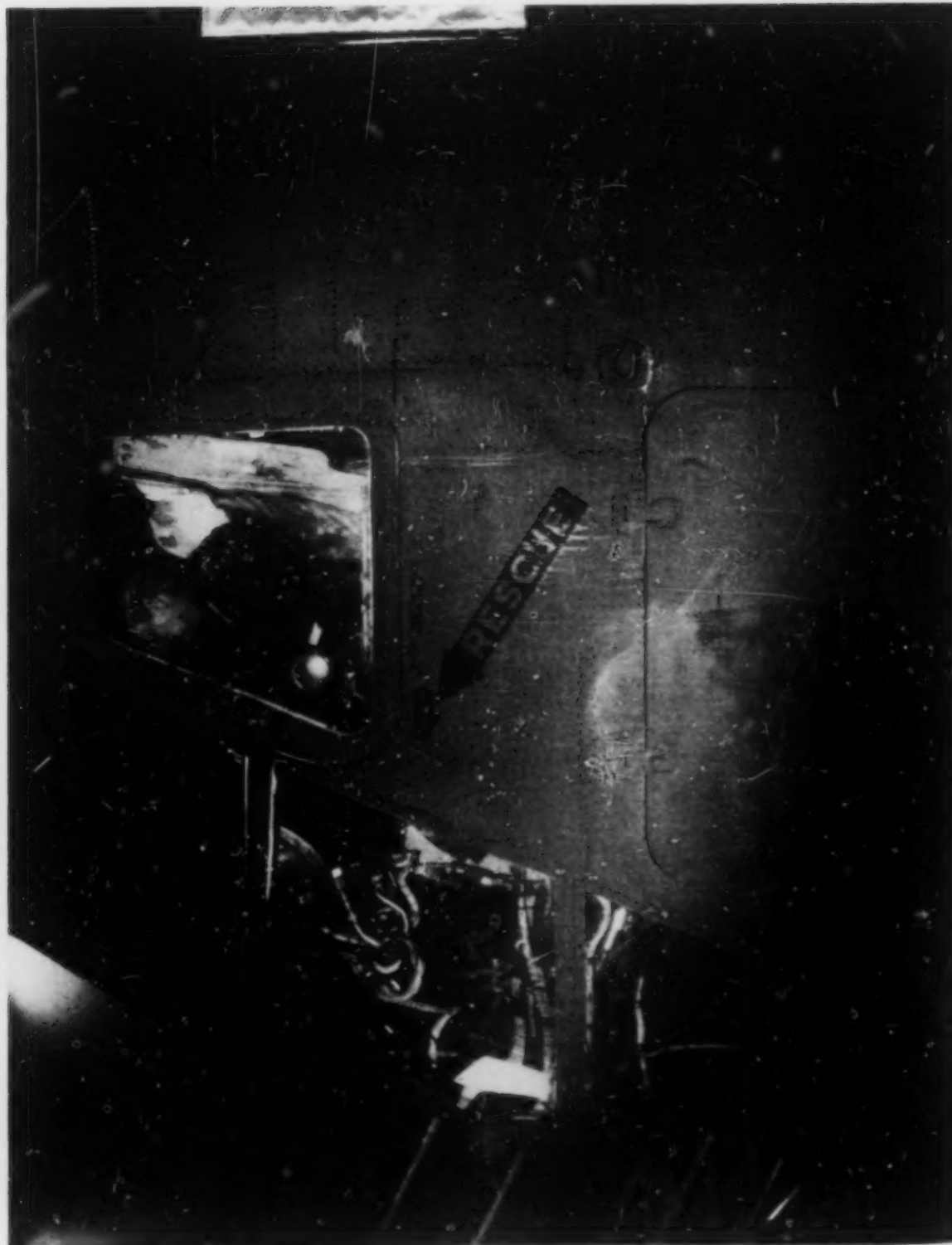
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DEFENDANT'S EXHIBIT 38



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DEFENDANT'S EXHIBIT 39

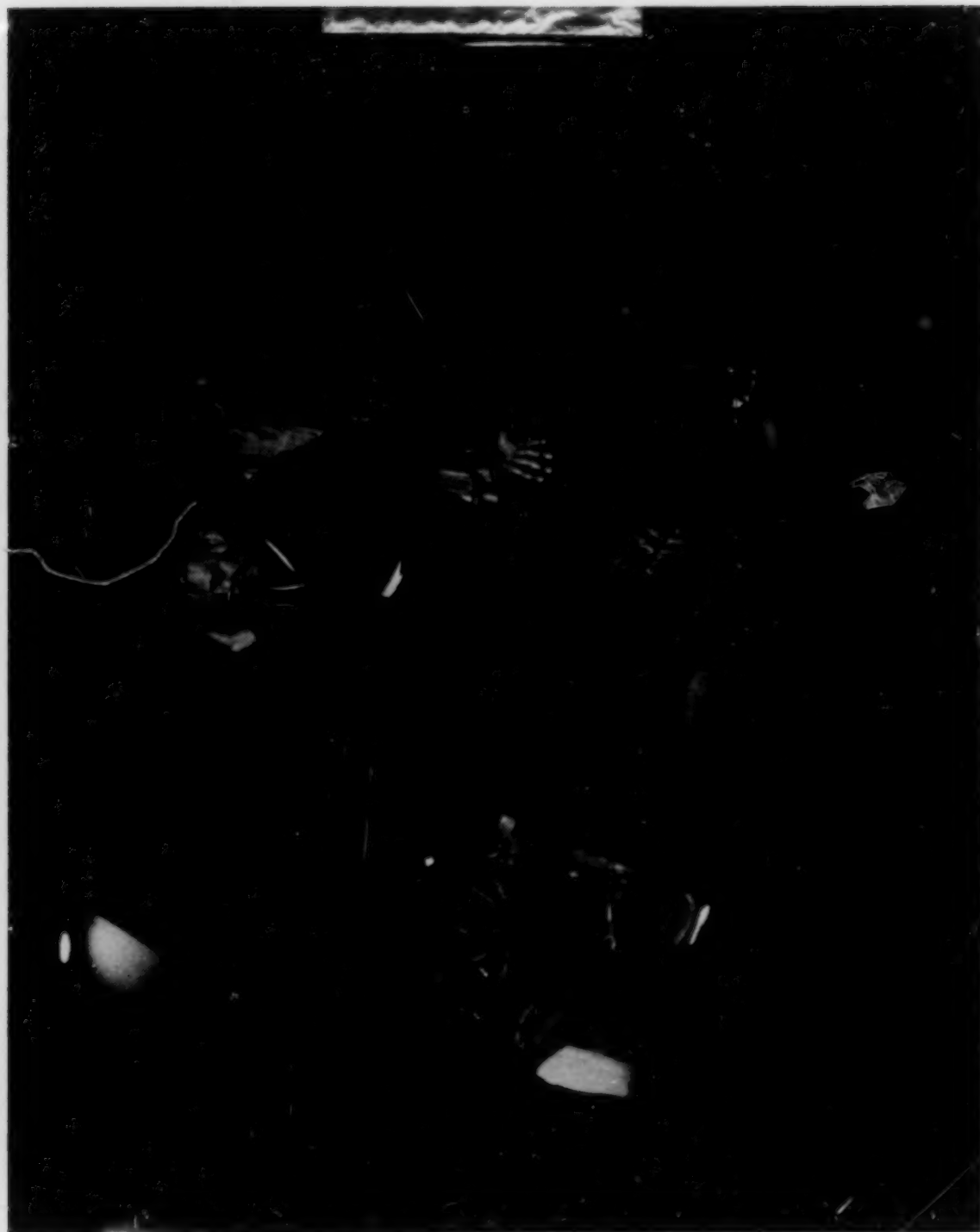


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DEFENDANT'S EXHIBIT 40



DEFENDANT'S EXHIBIT 41



PETITIONER'S BRIEF

(6)
No. 86-492

Supreme Court, U.S.

FILED

FEB 26 1987

JOSEPH F. SPANIOLO, JR.
CLERK

In The
Supreme Court of the United States

October Term, 1986

DELBERT BOYLE, personal representative of the Heirs
and Estate of David A. Boyle, deceased,

Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

On Writ Of Certiorari To The United States
Court Of Appeals For The Fourth Circuit

BRIEF FOR PETITIONER

LOUIS S. FRANECKE, Esq.

JOHN O. MACK, Esq.

MACK, HAZLEWOOD,

FRANECKE & TINNEY

221 Pine Street, Suite 600

San Francisco, CA 94104

415/391-1560

MICHAEL MOORE, Esq.

CARTWRIGHT, SUCHERMAN

& SLOBODIN, INC.

101 California Street, 26th Floor

San Francisco, CA 94111

415/433-0440

Counsel for Petitioner

QUESTIONS PRESENTED FOR REVIEW

- A. WAS PETITIONER'S CONSTITUTIONAL RIGHT TO TRIAL BY JURY DENIED WHEN THE CIRCUIT COURT FAILED TO REMAND THE CASE FOR TRIAL WHEN THE GOVERNMENT CONTRACTOR DEFENSE ADOPTED BY THE FOURTH CIRCUIT WAS AT VARIANCE TO THE INSTRUCTIONS ON THE GOVERNMENT CONTRACTOR DEFENSE GIVEN TO THE TRIAL JURY? IN OTHER WORDS, DID THE COURT OF APPEALS DECIDE THE LAW AND THE FACTS WITHOUT GIVING PETITIONER TRIAL BY JURY ON THE LAW AS ANNOUNCED? RESPONDENT HAD NOT RAISED THE ISSUE OF IMPROPER JURY INSTRUCTIONS IN THEIR APPEAL.
- B. WAS THE JURY DECISION BELOW IMPROPERLY OVERTURNED BY THE COURT OF APPEALS BECAUSE THEY ADOPTED AN IMPROPER TEST FOR THE GOVERNMENT CONTRACTOR DEFENSE?
- C. IN LIGHT OF THE CONFLICT IN DEFINITIONS OF THE "GOVERNMENT CONTRACTOR DEFENSE" IN THE VARIOUS CIRCUITS, WHAT ARE THE FACTUAL TESTS FOR THE GOVERNMENT CONTRACTOR DEFENSE TO BE UNIFORMLY APPLIED IN ALL CIRCUITS?
- D. SHOULD MILITARY EQUIPMENT MANUFACTURERS BE SHIELDED FROM EXPOSURE TO PRODUCT LIABILITY AND NEGLIGENT MANUFACTURE ACTIONS BY U.S. MILITARY PERSONNEL?

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TO: THE HONORABLE CHIEF JUSTICE AND ASSOCIATE JUSTICES OF THE SUPREME COURT OF THE UNITED STATES:

II.

JURISDICTION

The judgment of the Court of Appeals was entered on May 27, 1986. Petitioner timely petitioned the United States Court of Appeals for the Fourth Circuit for a Rehearing In Banc which was denied on June 25, 1986.

The jurisdiction of this Court is invoked pursuant to 28 U.S.C. § 1254(1).

III.

CONSTITUTIONAL AND STATUTORY PROVISIONS INVOLVED

The Constitution of the United States, Seventh Amendment, Right To Trial By Jury:

"In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury, shall be otherwise reexamined in any Court of the United States, then according to the rules of the common law.

IV.

STATEMENT OF THE CASE

A.

OPINIONS BELOW

Petitioner's decedent, a United States Marine Helicopter Co-Pilot, was riding in a CH-53D Helicopter built by Respondent, SIKORSKY CORPORATION DIVISION OF UNITED TECHNOLOGIES CORPORATION, when the aircraft made an uncontrollable right turn at low altitude crashing a mile and a half off the Virginia Beach shore, Virginia, on April 27, 1983. The pilot, crew chief and passenger escaped, but Petitioner's decedent, co-pilot, drowned in the helicopter when it sank.

Suit was brought in United States District Court for the Eastern District of Virginia at Richmond on the basis of situs of the accident was within the 3 mile limit of the Virginia coast and on diversity of citizenship (J.A. 79).

It was stipulated that Virginia substantive law applied.

On July 24, 1985, judgment was entered in the United States District Court, Eastern District of Virginia—Richmond Division, by jury verdict, in favor of Petitioner in amounts totalling \$725,000 and is reprinted in the Appendix to Petition for Writ of Certiorari, page A1.

On May 27, 1986, the United States Court of Appeals for the Fourth Circuit reversed this jury verdict and remanded with directions to enter Judgment for Respondent,

792 F.2d 413 (4th Cir. 1986). The opinion is reprinted in the Appendix to the Petition for Writ of Certiorari, page A2.

The same day, two other cases involving the same legal questions were decided by the Fourth Circuit; *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986); which is reprinted in the Appendix to the Petition for Writ of Certiorari, page A10 and *Dowd v. Textron, Inc.*, 792 F.2d 409 (4th Cir. 1986).

This Court has been requested to hear similar issues in *Shaw v. Grumman Aerospace Corporation*, 778 F.2d 736 (11th Cir. 1985); U.S. Supreme Court Case, No. 85-1529.

Petitioner's timely Petition for Rehearing In Banc to the Fourth Circuit Court of Appeals was denied on June 25, 1986, and is reprinted in the Appendix to Petition for Writ of Certiorari, page A24.

Thereafter, the United States District Court for the Eastern District of Virginia vacated its judgment and entered judgment for Respondent on July 7, 1986, which is reprinted in the Appendix to Petition for Writ of Certiorari, page A25.

B.

SUMMARY OF THE FACTS

Petitioner generally contended that decedent died because of three causes:

First: Respondent had negligently repaired a part of the control system of the helicopter (servo) which

proximately caused the helicopter to go out of control and crash into the sea;

Second: the helicopter control system was defectively designed and did not conform to the U.S. Navy's specifications; and

Third: the co-pilot escape system was defectively designed and did not conform to the U.S. Navy's specifications. The escape system handle could not be reached in this emergency and the escape window, which only opens out, would not open due to sea pressure holding it in while the helicopter was sinking.

The Purchase Contract of December 1968 (Respondent's Exhibit 20; R.T. 46-49*) between the United States Navy and Respondent for the design and purchase of the CH-53D Helicopters from Respondent, agreed at paragraph F-9, entitled, "Design Responsibility":

"In releasing design data or drawings, or in releasing aircraft for flight, the government accepts no responsibility for the successful operation of the equipment manufactured by the contractor." (J.A. 494-495, 497-498).

Further, paragraph F-14 at page 42 entitled, "Correction of Defects", states:

"Except for fraud, or such gross mistakes as amount to fraud, the contractors obligation with respect to correction or replacement...

(a) . . . the government shall have the right to require the contractor to remedy, and the contractor shall with due diligence remedy by correction or replacement, at the contractor's election at no increase in the contract price, any defects in material or workmanship or any failure to conform to the requirements

* R.T. refers to Reporter's Transcript of Trial Proceedings.

of this contract . . ." (Emphasis added) (J.A. 495-496, 498).

Petitioner's case was presented by testimony of the surviving pilot of the helicopter, Captain Tussing of the U.S. Marine Corps (J.A. 80-165); the crew chief of the helicopter, Sgt. Tubbs of the U.S. Marine Corps (J.A. 165-211); the duly appointed Judge Advocate General's investigator, Major Keown, of the U.S. Marine Corps and his investigative report including documents, and statements by witness and investigators (Pl. Ex. 1; R.T. 391) (J.A. 211-234, 470).

Also, by deposition, United States Navy's duly appointed engineering/accident investigator, Mr. Terry Fox, of the U.S. Navy at Pensacola, Florida (J.A. 29-77, 474). Mr. Fox was acknowledged by Respondent to know more about the control system of this type of helicopter than anyone (J.A. 300). Mr. Fox examined the wreckage and tore apart the mechanical parts to discover the cause of the crash (J.A. 51-52, 474; Pl. Ex. 3; R.T. 391). His official report and testimony found a metal chip in the roll servo to have been the cause (J.A. 29-77, 474).

By deposition, Respondent's own employee investigator, Mr. Jessie Clemons, acknowledged that the metal chip found by Mr. Fox would cause the helicopter to crash (J.A. 9, 21-22).

Petitioner's engineering expert witnesses Dr. James Hayes (J.A. 235-245), and Dr. Paul Packman (J.A. 246-282), explained and gave their opinions regarding the reasons why the metallic chip caused the helicopter to crash and why the escape system did not work.

Finally, the mother and father of the decedent testified to their damages from the loss of their son and friend (R.T. 309-327).

The documentary evidence encompassed certain specifications from the U.S. Navy, the Respondent's design documents and numerous photographs of the actual crashed helicopter and similar helicopters (J.A. 470-584).

The overwhelming conclusion by the jury was that Respondent had negligently repaired the control system causing the helicopter to crash; that the co-pilot escape system did not work when it was needed; that the control system was defective; and that the design did not conform to U.S. Navy Specification (J.A. 466).

1.

The Negligent Repair by Respondent

a.

The Chip

The pilot and co-pilot of a helicopter control their flight by two control sticks, called the collective and cyclic, and foot pedals (J.A. 86-87, 488). The pilot and co-pilot controls are linked mechanically to one another as well as to the various control places on the helicopter (J.A. 480, 486-488).

In addition, there are augmenting devices known as servos, which also control the helicopter like an auto pilot (Pl. Ex. 22, J.A. 480, 486-488). These servo devices afford the pilots assistance in flying, something like power steering in an automobile (J.A. 104, 486-487). However, if one of these servos goes out of control, it can make the helicopter go out of control and crash like the power steering in an automobile, turning the wheel unexpectedly, causing a crash into a tree.

The pilot of the ill-fated CH-53D helicopter, Captain Tussing, testified that his control stick suddenly continued

to move to the right after he had initiated a right turn for the helicopter at about 200' of altitude (J.A. 114-121).

Captain Tussing testified to his inability to correct the jammed stick, which was over on his right leg, despite his best efforts (J.A. 116-121). He said he had no time (due to the low altitude) to start other corrective measures to disengage his controls (J.A. 117-121). Finally, by pulling full collective, he was able to soften the impact of the aircraft into the water (J.A. 118-119). Captain Tussing was a 1,600 hour helicopter aircraft commander and an instructor who was quite capable of flying the helicopter had there not been some malfunction with the control system (J.A. 80-82).

Mr. Terry Fox, the appointed engineering investigator for the U.S. Navy, who had extensive experience both as a mechanic and engineer with the servo systems, found the most likely cause of the crash to be the chip found in the AFCS roll servo pilot or "Moog" valve (J.A. 52-53, 474). See (J.A. 470 "Pilot Valve"). The "Moog" valve being the part of the servo which controls the movements of the servo (J.A. 274-275).

Similarly, Dr. Paul Packman, Petitioner's engineering expert witness, Mr. Carlson, Respondent's investigator, Mr. Fox, the U.S. Navy's Investigator, and numerous of Respondent's witnesses agreed that a metallic chip causing a jam of the "Moog" or pilot valve of the servo would cause the aircraft to experience a right jam of the control stick (J.A. 52-53). The condition of the metallic chip being flattened at one end (J.A. 53-54), supported Dr. Packman's explanation regarding the jamming effect of the chip in the small "Moog" valve, creating a steady control stick

movement over to the right. This was entirely consistent with Captain Tussing's testimony (J.A. 258-265).

b.

The Origin of the Chip

The metal chip could only have gotten into the servo in one of three ways. That is: (1) due to maintenance activities by the U.S. Marines; (2) by minor repair work done by the U.S. Navy at Pensacola; or (3) by the complete rework and remanufacture by the Respondent. The jury concluded that it was the rework by the Respondent (R.T. 694).

After sinking, the helicopter became inverted in the mud in 35 feet of dark and murky water with its hydraulic lines open to the sea, admitting sea water, sand and other particles (J.A. 78-79).

Mr. Terry Fox, an independent witness, further testified that no screens or filters were found to have holes in them, which established that the "chip" had been present in the system for some period of time (J.A. 46, 53-54, 280-281; R.T. 389-390).

The screen filters, which were capable of filtering out this metallic chip, did not have a hole in them, establishing that the chip was not introduced during shipboard maintenance of the servo on the subject aircraft (J.A. 46, 280-281; R.T. 389-390).

Mr. Fox testified that in his investigation, other contaminants found in the hydraulic system were consistent with normal deterioration of the seals and aluminum housings as well as immersion in the sea water (J.A. 48-49, 67-68).

Further, the likelihood of the chip being introduced at Pensacola, Florida, by the Navy was extremely unlikely due to the fact that the Navy did not disassemble the "Moog" valve from the servo (the chip being found in the "Moog" valve). This was established by Mr. Fox's testimony of seeing yellow paint on the screws being undisturbed (paint applied by Respondents) (J.A. 64) and finding the nature and extent of the repair work done at Pensacola to be relatively minor (J.A. 61).

Also, Mr. Bill Herald (J.A. 471-472; Pl. Ex. 11; R.T. 391), of the U.S. Navy Newark facility, had done a quality inspection audit and determined that the type of metal, steel 1010, was not used by the U.S. Navy at Pensacola (J.A. 471-472). This investigation was done at the time of the actual crash and not some two years later as was the one conducted by Respondent's witness, Mr. Ashbury (J.A. 399-401). Respondent failed to produce the better evidence of the Respondent employee who actually was stationed in Pensacola at the time of the crash (J.A. 402).

Conclusively, it was established that Sikorsky had totally disassembled and remanufactured the servo, including the "Moog" valve (J.A. 334-335). None of Respondent's witnesses had actual first-hand knowledge as to what metal wire was used in their shop or at the Moog factory (J.A. 333).

The evidence was overwhelming.

The jury found the Respondent had been negligent in their repair of the servo.

c.

Virginia Law

Respondent relied heavily on the Virginia case of *Logan v. Montgomery Ward Company, Inc.*, 216 VA 425 (1975) for a proposition that Petitioner must eliminate any other possibility that the fault was not the Respondent's. That is not what the *Logan* case says and this would amount to a burden of proof that would approach the criminal criteria proving the case beyond a reasonable doubt. That is not the law.

In *Logan, supra*, a gas stove exploded, causing injuries. Unfortunately, the gas stove had been junked right after the accident and was not examined by engineers or experts for Plaintiff or Defendant. Hence, the actual cause of the gas leak and explosion could not be established except by purely speculative proof. "What caused the leak was not testified by any witness" (page 689).

However, here, the crashed helicopter was brought back from the ocean and examined extensively by the United States Navy, and Respondent. Numerous engineers and investigators took each part of the wreckage apart for engineering study. Careful investigation was made regarding the source of the metal chip which caused the accident. Extensive testimony was presented at trial showing, by a preponderance of the evidence, and based on the actual physical examinations of the wreckage, what the source of the chip was. This is by no means similar to the *Logan* case where the gas stove had disappeared after the accident and was never examined by anybody.

Respondent argues that if there were two equally likely events which could have caused the accident, the verdict

of Petitioner cannot be sustained. See *Cape Charles Flying Service v. Nottingham*, 187 VA 444, 451; 47 S.E.2d 540 (1948). However, the operative words are "equally likely".

Respondent's witness and engineer, Roderick MacLennan, admitted that the most probable source of the metallic chip was, in fact, Respondent (J.A. 360-366).

There was nothing "equally likely". The evidence clearly preponderated that Sikorsky had introduced the metal chip. The jury so found.

2.

The Control System Defect Not Communicated to the U.S. Navy

The elements of the design defect which Respondent was or should have been aware and that had not been presented to the Navy were:

1. That the amount of force (55 lbs.) required for a pilot to control the "roll" servo (override forces), during a worst malfunction of the AFCS system, is uncontrollable by a pilot;
2. The overriding forces are not capable of being exerted without disengagement of the system by the pilot when the pilot is close to the ground; and
3. That a safety shear pin is only connected to the number two system and not to the number one system. The helicopter in this case was operating on the number one system.

The Override Force

To briefly review, the Automatic Flight Control System (AFCS) on the subject helicopter acted like power steering. When the power steering went awry, the pilot was forced into an uncontrolled condition where the power steering was working against his efforts to control the helicopter.

The government requested in Respondent's Exhibit 13 (R.T. 46-49), "Detailed Specifications for Model CH-53D Helicopter", prepared by the Department of the Navy, page 45, paragraph 3.10.3.1—"Basic Automatic Flight Control System" (AFCS):

"An AFCS shall be provided in accordance with a *contractor prepared specification . . .*" (Emphasis added) (J.A. 493).

Plaintiff's Exhibit 88 (R.T. 391), Military Specification, MIL-C-18244A, 1 December 1962, paragraph 3.1.1.3.6 "Overpower":

"With the automatic flight control system engaged and operating, it shall be possible to manually overpower or countermand the control action of the system . . ." (J.A. 490).

Paragraph 3.1.1.3.10 "Control Stick . . . Maneuvering":

"This maneuvering capability shall be possible at any time when the automatic flight control system is engaged by using the normal aircraft controls." (J.A. 491).

The Respondent had the responsibility to design the system and prepare the specifications. Respondent accepted that responsibility (J.A. 494, 497).

The Respondent stated to the government in Petitioner's Exhibit 20 (R.T. 391), "Automatic Flight Control

System (AFCS) Detailed Specifications", 4, prepared by Respondent, page 8, paragraph 3.3.1.6—"Override Provisions"—:

"All of the channels of the AFCS have differential inputs and *may be overridden by the pilot without disengagement of the system* or damage to the system regardless of the signal levels in the controls." (Emphasis added) (J.A. 478).

A specific statement by Respondents that the system can be overridden.

Paragraph 3.3.1.6.1—"Override Forces":

"The override forces shall not exceed the following values *in the worst malfunction of the AFCS . . .*" (Emphasis added) (J.A. 478).

There is then no specification by Respondent of the override forces for the "roll servo" involved in this case. The U.S. Navy was assured by Respondents that the system could be overridden. Tragically, it could not.

Respondent's Exhibit 20 (R.T. 46-49), the Purchase Contract, for the CH-53D Helicopters, paragraph F-9 entitled, "Design Responsibility":

"In releasing design data or drawings, or in releasing aircraft for flight, the government accepts no responsibility for the successful operation of the equipment manufactured by the contractor" (J.A. 495, 498).

Respondent accepted this responsibility.

Further, paragraph F-14 at page 42 entitled, "Correction of Defects", states:

"Except for fraud, or such gross mistakes as amount to fraud, the contractors obligation with respect to correction or replacement . . .

(a) . . . the government shall have the right to require the contractor to remedy, and the contractor shall with due diligence remedy by correction or replacement, at the contractor's election at no increase in the contract price, *any defects in material or workmanship or any failure to conform to the requirements of this contract . . .*" (Emphasis added) (J.A. 495-496, 498).

Petitioner's Exhibit 20 (J.A. 477; R.T. 391), the specifications for the AFCS, prepared by Respondent was the only presentation to the Government on this subject. This report failed to inform the Government about the worst case malfunction of the "roll" servo (J.A. 263-265, 478).

Specifically at page eight the collective and yaw aspects of the AFCS system were addressed, but the "roll" system was not addressed with regard to the worst case malfunction (J.A. 263-265, 478).

Testimony at trial showed that amount of force was approximately fifty-five (55) pounds or almost twice as much as any of the other systems (J.A. 261, 264-265, 380-382, 476, 499).

Fifty-five (55) pounds was determined by Respondent only *after* the crash (J.A. 476, 499).

Respondent's own employee and designated expert, Mr. Knute Hanson, testified that there was no warning by Respondent to the United States government for the worst malfunction of the AFCS and what it was going to take to get out of the roll under the worst malfunction of the AFCS (See J.A. 261, 264-265, 380-382).

Likewise, no evidence was introduced by Respondent that the U.S. Navy was aware of this problem (See J.A. 489). Yet, this design limit was knowledge which ought to be known by Respondent.

Respondent's own employee, Mr. Jesse Clemons, one of the investigators at the actual scene of this crash, testified that the force to overcome the "hard-over" of the roll servo would be fifty-five (55) pounds (J.A. 25-26).

Respondent's employee, engineer and designated expert, Mr. Roderick MacLennan, testified that the hard-over force of the roll servo would be approximately fifty-five (55) pounds to move against (See J.A. 366-369).

Respondent never warned the United States government of the force required of the pilot to override the system (J.A. 380-382, 476, 478). Respondent presented no evidence on this critical issue (J.A. 263-265).

The U.S. Navy could not therefore, knowingly accept and approve the system (J.A. 489). The jury concluded that the responsibility was Respondent's.

b.

The System Must Be Disengaged to Override and the Shearpin is Not on Number One System

Respondent's Exhibit 13 (R.T. 46-49), "Detailed Specifications for Model CH-53D Helicopter", prepared by the Department of the Navy, page 45, paragraph 3.10.3.1—"Basic Automatic Flight Control System" (AFCS):

"An AFCS shall be provided in accordance with a *contractor prepared specification . . .*" (Emphasis added) (J.A. 493).

The Respondent had the responsibility to design the system and prepare the specifications.

Petitioner's Exhibit 20 (R.T. 391), Automatic Flight Control System (AFCS) Detailed Specifications 4, pre-

pared by Sikorsky page 8, paragraph 3.3.1.6—"Override Provisions"—:

"All of the channels of the AFCS have differential inputs and *may be overridden by the pilot* without disengagement of the system or damage to the system regardless of the signal levels in the controls." (Emphasis added) (J.A. 478).

A specific statement by Respondent that each channel of the system can be overridden.

Paragraph 3.3.1.6.1—"Override Forces":

"The override forces shall not exceed the following values *in the worst malfunction of the AFCS . . .*" (Emphasis added) (J.A. 478).

There is then no specification by Respondent of the override forces for the "roll servo" involved in this case. The U.S. Navy could only conclude from the previous paragraph that each channel of the system could be overridden. Tragically, it could not.

A shear pin is a device designed to fail at a predetermined load and free the system. (J.A. 258-261).

Here, the shear pin was designed only for the number two AFCS channel, but, the pilot was flying on the number one channel (J.A. 24-25). There was no shear pin mechanism available to him to override the system that had gone awry (J.A. 258-261). He could not override 55 pounds force and he had no shear pin (J.A. 116-117).

The jury found the AFCS System to be defective.

3.

The Defective Escape System

The aircraft, after crashing into the water, while sinking rapidly, rolled left (toward co-pilot's side) (J.A. 127).

The co-pilot's escape window only opens out, not in, and could not have been opened against the sea water (J.A. 473, 481-482, 583).

Respondent's Exhibit 13 (R.T. 46-49), "Detailed Specifications for Model CH-53D Helicopter", prepared by the Department of the Navy, page 40, paragraph 3.7.1.7—"Emergency Escape":

"Emergency escape shall be provided for pilot and co-pilot through both cockpit side windows which shall be *readily jettisonable*. Both internal and external handles shall be provided to actuate the release mechanism . . ." (Emphasis added) (J.A. 493).

Respondent's Exhibit 11 (R.T. 46-49), Department of the Navy—"Special Specifications for Design and Constructions of Aircraft Weapon Systems", March 1959—page 25, paragraph 3.7.1.7.1—"Manual Escape Exits":

"Manual escape exits shall be provided as necessary to permit ready and safe egress of rotary wing aircraft occupants in an emergency. All hatches, doors, windows, or ports, which are to be used as emergency escape exits, shall be quick opening, easily operable, and shall be jettisonable when in the fully closed position, the fully open position, and in any intermediate position between fully closed and fully open . . ." (J.A. 492).

Thus, the U.S. Navy's specifications are most general and it is left to the contractor to prepare the design.

Respondent's Exhibit 20 (R.T. 46-49), the Purchase Contract, for the CH-53D Helicopters, paragraph F-9, "Design Responsibility":

"In releasing design data or drawings, or in releasing aircraft for flight, the government accepts no respon-

sibility for the successful operation of the equipment manufactured by the contractor." (J.A. 495, 498).

Further, paragraph F-14, page 42, "Correction of Defects", states:

"Except for fraud, or such gross mistakes as amount to fraud, the contractor's obligation with respect to correction or replacement . . .

(a) . . . the government shall have the right to require the contractor to remedy, and the contractor shall with due diligence remedy by correction or replacement, at the contractor's election at no increase in the contract price, *any defects in material or workmanship or any failure to conform to the requirements of this contract . . .*" (Emphasis added) (J.A. 495-496, 498).

When the collective is pulled full up, it blocks the co-pilot's access to his only escape hatch handle (J.A. 220-221, 475). The pilot testified he had pulled the collective full up just prior to impact, blocking access to the control handle as shown by Petitioner's witnesses' testimony and photographic exhibits (J.A. 119, 220-221, 234, 475). The pilot's on the other hand, is not so blocked.

When the aircraft rolled, it rolled left, or toward the co-pilot (J.A. 127). This put the escape window under water and non-useable due to water pressure. This design did not conform to the Navy specifications for a readily jettisonable escape system under all conditions (J.A. 492, 493).

The stipulated facts also show that the water was murky with visibility of only three feet (J.A. 78-80). The surviving crew members testified that it was by sheer luck that they were able to get themselves out in the very dis-

orienting murky water after the helicopter had rolled over (J.A. 128-129, 180-181).

Decedent had attempted to escape during the actual sinking of the helicopter. He had disconnected his seat belt and shoulder harness and had suffered lacerations on his left hand that correspond to attempts to find the escape handle in the brown, murky water where visibility was only three feet (J.A. 78-80; Pl. Ex. 1; R.T. 391).

Also, the pilot described how he had been sucked back into the aircraft as it sank (J.A. 128-129). This sucking clearly accounts for how Decedent was pulled into the aft cabin, a dark, disorienting situation. Thus, despite Decedent being the best swimmer and sitting next to a supposed escape hatch, he died (J.A. 79).

There was no testimony by Respondent of any test, any reports, any specifications or any dialogue between Respondent and the U.S. Navy that the co-pilot escape window would not open while the aircraft was sinking and the window was held in place by water pressure. The record is totally devoid of any such dialogue between Respondent and the U.S. Navy.

There was no testimony or evidence that the U.S. Navy was aware of and had accepted this defect in design.

Respondent testified to an alleged mock-up shown the Navy which was not a working model and which had not been immersed in water. There was no testimony that the Respondent tested or demonstrated this mock-up under water to the U.S. Navy. There was no photograph or even a diagram of this "mock-up" presented by Respondent to the jury.

Nor did the Navy have any knowledge thereof, since the Navy's training for the pilots and their escape simulator, while under water, were without windows at all (J.A. 233-234). No Navy personnel testified in support of Respondent's position regarding the escape system.

In conclusion, the jury found that not only did the Respondent knowingly fail to inform the U.S. Navy of the overriding force on the servo, they failed to inform the Navy of the escape window being held in place by water pressure. Either one of these issues was sufficient for the jury to find for Petitioner.

The jury unanimously returned a verdict for Petitioner.

V.

SUMMARY OF ARGUMENT

A.

THE JURY'S VERDICT SHOULD BE UPHELD

1. The Court of Appeals Departed From Acceptable And Usual Judicial Proceedings Because The Trial Court Gave The Agent Orange Test Jury Instructions And The Court Of Appeals Adopted The McKay Test And Did Not Remand For Jury Trial On The Law As Announced.

The jury below was instructed regarding the government contractor defense along the lines of *In Re Agent Orange Product Liability Litigation*, 534 F.Supp. 1055 (E.D.N.Y. 1982), *cert. denied*, 465 U.S. 1067, which provides: 1. The government established or approved specifications; 2. The helicopter conformed to the specifications; and 3. The United States knew as much or more than the Respondent about the helicopter's hazards (J.A. 461).

However, the Court of Appeals, in its announcement in *Tozer v. LTV Corporation*, *supra*, decided the same day as the case herein, followed *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984), and determined the defense to be; 1. That the United States Government approved reasonably precise specifications; 2. The equipment conformed to the specifications; and 3. That the contractor warned the United States about dangers in the use of the equipment that were known to the supplier but not to the United States (*Tozer, supra*, at 408).

The difference is did the contractor take affirmative action (*McKay*) or did the government already know about the hazard (*Orange*) from whatever source.

In light of the vast amount of evidence for Petitioner, the Fourth Circuit should have remanded the case for a new trial based on the change of the law of the government contractor defense as announced. The Court did not view the evidence in the light most favorable to the jury verdict and did not give the prevailing party the benefit of all reasonable inferences which can be drawn from the evidence. *Klein v. Sears Roebuck Company*, 773 F.2d 1421, 1424 (4th Cir. 1985).

Respondent in the Fourth Circuit did not raise the issue of improper government contractor defense jury instruction. Consequently Petitioner had not argued the issue before the Fourth Circuit. The jury, however, who heard the evidence, found against Respondent.

Petitioner has not received a trial by jury based upon the law first announced by the Fourth Circuit Court of Appeals and in variance to the instruction given to the jury in

the District Court. This is a violation of the Seventh Amendment to the United States Constitution, Right to Jury Trial.

2. The Government Contractor Defense Is A Jury Question And The Court Of Appeals Improperly Decided The Case On Law Just Announced Without Remanding For A Trial By Jury On The Facts Regarding The Just Announced Law.

All the circuits which have adopted the Government Contractor Defense have agreed that the defense is a jury question and that the burden of proof is on the Respondent.

The Seventh Amendment, Right to Jury Trial, expresses the Federal Policy favoring jury decisions of disputed fact questions. *Atlantic and Gulf Stevedores, Inc. v. Ellerman Lines, Ltd.*, 369 U.S. 355, 82 S.Ct. 780 (PA 1962). When there is a debatable issue of fact in the trial of a suit at common law in a Court of the United States, the right to have it determined by jury is guaranteed by the Seventh Amendment. *Hunt v. Bradshaw*, 251 F.2d 103, (Ct. App. N.C. 1957).

Respondent did not argue that the trial Court had improperly instructed the jury regarding the Government Contractor Defense (J.A. 5-6). Respondent merely argued that it had presented sufficient evidence to support the defense according to the jury instructions on the law (J.A. 6). The jury, who heard the case, thought otherwise.

The Fourth Circuit Court of Appeals took it upon themselves to not only change the law, but then to determine the factual issues without the benefit of the jury.

3. There Is A Conflict And Confusion In The Lower Courts Regarding The Government Contractor Defense.

Various circuit Courts have adopted two basic forms of the Government Contractor Defense and two hybrid versions. The 9th Circuit in *McKay v. Rockwell International Corp.*, *supra*, enunciated the defense as follows:

1. The United States Government established or approved reasonably precise specifications for the allegedly defective material;
2. The equipment conformed to these specifications; and
3. The supplier warned the United States about patent errors in the Government specifications or about the dangers involved in the use of the equipment that were known to the supplier but not to the United States.

The Seventh and Fifth Circuits adopted the *McKay* test.

The other major version was announced in *Agent Orange*, *supra*, wherein the defense was enunciated as:

1. Proof that the government established contract specifications for the product;
2. That the contractor complied in all material respects with the specifications; and
3. That the government's knowledge of the hazards of the finished product was at least equal to that of the contractor.

The difference between *McKay* and *Agent Orange* is that *McKay* erroneously requires the manufacturer to warn the government only if the manufacturer has knowledge of the defect. This does not insure that the government in fact knows of the danger.

In *Koutsoubos v. Boeing Company*, 755 F.2d 352-354, 355 (3d Cir. 1985) the Court announced a hybrid version. It adopted the *Agent Orange* test but government approval of specifications developed through a continuous series of negotiations between the contractor and the military would satisfy the first prong of the defense. The Court unfortunately does not specify that the specific hazard or defect must have been discussed during the negotiations.

The most well thought out version is *Shaw v. Grumman Aerospace Corporation*, *supra* at 745. The Court's concern was whether or not the military actually made a decision to use a product that it knew to be dangerous to servicemen. They said:

"The test was; 1. that the contractor proved that it did not participate, or participated only minimally, in the design of those products or parts of the product known to be defective or; 2. that it timely warned the military of the risk of the design and notified it of alternative design reasonably known by the contractor, and that the military, although forewarned, clearly authorized the contractor to proceed with the dangerous design . . .

The risks are those known or should have been known given good design practices in the industry."

The Fourth Circuit in *Tozer* adopted the *McKay* test but applied *Koutsoubos* reasoning which was in variance to all other circuits.

4. The Court Of Appeals Adopted An Improper And Non-Functional Set Of Tests For The Government Contractor Defense And Thus Improperly Reversed The Jury Verdict Below.

The Fourth Circuit adopted the *McKay* criteria regarding the Government Contractor Defense and applied some of the *Koutsoubos* reasoning.

However, if the defense is to be properly fashioned:

1. Who generated the specifications and who generated the design of the product? The jury concluded the responsibility was Respondent's (J.A. 466).

2. Did the United States Government accept the design of the product or did it accept the contractor's specifications setting forth what the design is supposed to be? Here, the government, by contract, put defect responsibility on Respondent and Respondent accepted that responsibility (J.A. 495-496, 498).

3. Does the product conform to the design or the specifications? The jury concluded it did not (J.A. 466).

4. Did the government knowingly accept the specific defect complained of? Here, there was no evidence it had.

5. Was the defect a "nut and bolt" defect or something on the cutting edge of technology inherently dangerous but necessary to the government? Here, they were elementary defects. (See STATEMENT OF THE CASE)

6. Is there a question of military mission or military discipline involved in the specific defect? Here, there was no evidence the defects were of military mission or discipline significance.

The *McKay* test does not warn the government of a particular defect, while *Agent Orange* does. In *McKay*, the manufacturer may hide behind ignorance or non-testing of a particular product and avoid liability merely by saying, "We didn't know about it".

Under *McKay* the burden of proof is on the Plaintiff to prove that the contractor knew or should have known

of a particular defect. The defense *should* require the contractor to go forward with his evidence to meet his burden of proof. Under *McKay*, when the contractor denies knowledge the burden shifts to the Petitioner. There is no burden on the contractor at all to prove an act of omission (*McKay*) rather than an act of commission (*Orange*).

However, there is little difference between *McKay* and *Agent Orange* if the contractor and the government both are ignorant of the defect. The defense stands. This does not promote the objective of enabling the government to knowingly accept a defect in a particular product for its own reasons.

The government, in its contract, has clearly put the responsibility for defects not known to it on the contractor. The contractor accepts said responsibility and agrees to correct all defects at its own expense (J.A. 495-496, 498).

Koutsoubos reasoning also is flawed in that a back and forth discussion between the military and the contractor may not include discussion of the particular defect involved. The question is, what was being considered in the back and forth, not the quantity of back and forth.

Shaw, on the other hand, states that the contractor may escape only if its participation was minimal or that it warned of the particular risks and submitted alternative designs. This is the best test to address the specific issues and enable the government to determine if it wants to accept a specific defect in a particular design for its own reasons. Here, under the *Shaw* test, the evidence overwhelmingly preponderates against Respondent.

5. Does A Sound Policy Exist For The Allowance Of The Government Contractor Defense To Shield The Military Equipment Manufacturer From Product Liability Or Negligent Design?

The United States purchases billions of dollars of equipment from military suppliers.

The origin of the Government contractor Defense lies in the *Feres-Stencel Doctrine*, 340 U.S. 135 (1950) and 431 U.S. 666 (1971) which shields the government from paying for injuries to its servicemen. Something like Workers' Compensation.

However, in *United States v. Shearer*, 474 U.S. —, 105 S.Ct. 3039, 87 L.Ed.2d 38 (1985) the Court makes it clear that the only relevant consideration determining whether the *Feres Doctrine* or the "separation of powers doctrine" applies is whether the suit requires a civilian court to second guess military decisions . . . and whether the suit might impair essential military discipline; that the other rationales for the doctrines which have appeared from time to time in decisions are, "no longer controlling", *Shearer, supra* at 44.

Even the rationale of separation of powers of the military versus the judiciary was limited in the *Bynum v. FMC Corp.* case, 770 F.2d 556 (5th Cir. 1985). The issue was whether the manufacturer could be held responsible for a defective product that had, by stipulation, been designed by the U.S. Government.

Bynum limited separation of powers only as it applied to the circumstances of that case. The contractor merely manufactured the product according to the government design.

The Courts do not need to question military decisions. The Courts only determine if the military *accepted a defect* for the military's own reasons. The *reasons* do not need to be examined by the Courts.

6. The Facts In This Case Uphold Judgment For Petitioner Under Either The Government Contractor Defense Given Or One Fashioned By This Court.

The facts in the STATEMENT OF THE CASE support the jury's determination of Respondent's liability under any statement of the Government Contractor Defense applied by this Court.

The government, in its contract, agrees with the contractor that the responsibility for the design and the responsibility to correct the defects which appeared in this case are the Respondent's (J.A. 495-496, 498).

The jury unanimously concluded that the specifications were not reasonably precise and that the defects had not been approved by the government regarding the override forces on the servo and the emergency egress system.

In addition, the jury was instructed under the more conservative *Agent Orange* test wherein the Navy had to know as much or more than the Respondent about the helicopter's hazards from *any* source. Respondent did not convince the jurors that the United States knew about the override forces (since Respondent had not told them about it) nor that the egress system was in conformance to the government's desires. The jury heard the evidence and they decided against the Respondent under stricter requirements than *McKay* or *Shaw*.

Therefore, either way that this Court decides, the jury's verdict should be upheld and the judgment reinstated.

VI.

ARGUMENT

A.

THE COURT OF APPEALS DEPARTED FROM ACCEPTABLE AND USUAL COURSE OF JUDICIAL PROCEEDINGS BECAUSE THE TRIAL COURT GAVE THE "AGENT ORANGE" TEST INSTRUCTIONS AND THE COURT OF APPEALS ADOPTED THE "McKAY" TEST AND DID NOT REMAND FOR JURY TRIAL ON THE LAW AS ANNOUNCED.

The jury below was instructed regarding the Government Contractor Defenses as follows:

"In addition, Plaintiff cannot recover either under a theory of negligence or breach of implied warranty based on a design defect if Defendant UNITED TECHNOLOGIES CORPORATION proves, by a preponderance of the evidence:

1. That the United States Navy established or approved the specifications for the co-pilot egress system;
2. That the helicopter conformed to these specifications; and
3. That the United States Navy knew as much or more than the Defendant about the helicopter's hazards and, therefore, Defendant did not need to warn the government of the dangers involved in the use of the equipment. It is not necessary for Defendant UNITED TECHNOLOGIES CORPORATION to prove that the government established every exact detail of the egress system. However, Defendant must prove by a preponderance of the evidence that the United States Navy specifications were more than

just general requirements, or that the Navy examined or agreed to a detailed description of the system." (J.A. 461). See, *In re Agent Orange, supra*.

However, the Court of Appeals announced in *Tozer v. LTV Corp., supra*, at 408, decided on the same day as the case herein, that the Fourth Circuit adopted the following Government Contractor Defense:

"A military contractor can escape liability for a design defect if it can demonstrate that:

1. The United States is immune from liability;
2. The United States approved reasonably precise specifications for the equipment;
3. The equipment conformed to these specifications; and,
4. The supplier warned the United States about dangers in the use of the equipment that were known to the supplier but not to the United States." See *McKay v. Rockwell International Corp., supra*.

Here, the United States District Court, in essence, gave the *Agent Orange* test to the jury and the jury found the Respondent did not meet its burden of proof and that the Respondent was liable. However, the United States Court of Appeals then applied, in essence, the *McKay* test and took the place of the jury to find that the Respondent was not liable.

Importantly, Respondent did not argue that the trial Court had improperly instructed the jury regarding the Government Contractor Defense (J.A. 6). To the contrary, Respondent merely argued that it had presented sufficient evidence to support that defense according to the jury instructions on the law. The jury, who heard the case, thought otherwise.

Consequently, Petitioner has never been afforded the opportunity of briefing and arguing the case (with citations to appropriate evidence, etc.) regarding the facts on the Government Contractor Defense as announced by the Fourth Circuit herein. This amounts to a trial without due process and without trial by jury.

Petitioner had no reason to believe that the Fourth Circuit Court of Appeals would not agree that the trial Court's instructions were appropriate since that issue was not raised on appeal.

Petitioner has not received a trial by jury based upon the law first announced by the Fourth Circuit Court of Appeals in variance to the law as given to the jury in the District Court. This is clearly a violation of the Seventh Amendment to the United States Constitution of Right To Trial By Jury.

The Court of Appeals below should have remanded the case for a new trial based on a change in the law of the Government Contractor Defense from the law on which the jury was instructed.

In determining whether or not the evidence was sufficient to uphold the verdict, the Court of Appeals "must view the evidence in a light most favorable to the jury's verdict and give the prevailing party the benefit of all reasonable inferences which can be drawn from the evidence. *Klein v. Sears Roebuck Company, supra* at 1424, citing *Krotkoff v. Goucher College*, 585 F.2 675, 677 (4th Cir. 1978).

Yet, the Court of Appeals, strained to reverse the case by ignoring the wealth of evidence favorable to Petitioner's jury verdict. (See STATEMENT OF CASE). The jury placed more credence in the Petitioner's evidence than that of the Respondent.

The Fourth Circuit, reversing the two other similar cases, decided on the same day (*Tozer* and *Dowd*, *supra*) were caught up in a momentum which ignored Petitioner's basic rights.

The District Court instructed according to *Agent Orange*, *supra*. Yet, the Court of Appeals announced the criteria to be *McKay* and *Koutsoubos*, *supra*. The jury never had an opportunity to consider the facts and the law as presented in the case. The Court of Appeals announced its own law and made its own fact decision. This is clearly a violation of the Seventh Amendment, Right to Trial by Jury.

B.

IF THE GOVERNMENT CONTRACTOR DEFENSE IS A JURY QUESTION, THE COURT OF APPEALS IMPROPERLY DECIDED THE CASE ON LAW IT JUST ANNOUNCED WITHOUT REMANDING FOR A TRIAL BY JURY ON THE FACTS REGARDING THE JUST ANNOUNCED LAW.

The various circuits which have adopted the Government Contractor Defense agree that the defense is a jury question and the burden of proof is on the Defendant. *Koutsoubos v. Boeing Co.*, *supra*; *In Re Air Crash Disaster at Manheim, Germany*, 769 F.2d 115 (3rd Cir. 1985); *McKay v. Rockwell International Corp.*, *supra*; *Tillett v. J. I. Case Company*, 766 F.2d 591 (7th Cir. 1985); *Schoenborn v. Boeing Company*, 586 F.Supp. 711 (E.D. PA. 1984); *Shaw v. Grumman*, *supra*.

If this is so, and if this Court decides to adopt the Government Contractor Defense announced by the Fourth Circuit in *Tozer*, then the Fourth Circuit should have remanded the case for retrial before a jury.

The Seventh Amendment, Right to Jury Trial, expressed the Federal policy favoring jury decisions of dis-

puted fact questions. *Atlantic and Gulf Stevedores, Inc. v. Ellerman Lines, Ltd.*, *supra*. When there is a debatable issue of fact in the trial of a suit at common law in a Court of the United States, the right to have it determined by jury is guaranteed by the Seventh Amendment. *Hunt v. Bradshaw*, *supra*. See also *Helene Curtis Industries, Inc. v. Pruitt*, 385 F.2d 841, (Ct. App. TX 1967), *cert. denied*, 391 U.S. 913, 88 S.Ct. 1806.

Respondent below did not argue that the trial Court had improperly instructed the jury regarding the Government Contractor Defense. Respondent merely argued that it had presented sufficient evidence to support the defense according to the jury instructions on the law. Of course, the jury, who heard the case, thought otherwise (J.A. 466).

The Fourth Circuit Court of Appeals took it upon themselves to not only change the law, but then to determine the factual issues without the benefit of a jury.

This amounts to a trial without due process and without a trial by jury.

The Fourth Circuit has not followed the mandate that the jury finds the factual issues.

Petitioner respectfully contends that the Fourth Circuit of Appeals has so far departed from the accepted and usual course of judicial proceedings as to call for an exercise of this Court's power of supervision.

C.

THERE IS CONFLICT AND CONFUSION IN THE LOWER COURTS REGARDING WHAT IS THE GOVERNMENT CONTRACTOR DEFENSE.

The various circuit Courts have adopted two basic forms of the Government Contractor Defense and two hybrid versions.

The Ninth Circuit announced in *McKay v. Rockwell International Corp.*, *supra*, that a supplier of military equipment is not liable for design defect where:

- "1. The supplier proves that the United States established or approved, reasonably precise specifications for the allegedly defective military equipment,
2. The equipment conformed to those specifications, and,
3. The supplier warned the United States about patent errors in the government's specifications or about the dangers involved in the use of the equipment that were known to the supplier but not to the United States."

The Seventh and Fifth Circuits adopted the *McKay* test without modifications in *Tillett v. J. I. Case Company*, *supra* at 596-598, and *Bynum v. FMC Corporation*, *supra* at 561-562.

The other major version of the standard was announced in *In re Agent Orange Product Liability Litigation*, *supra*. Those three elements are:

- "1. Proof that the government established contract specifications for the product;
2. Proof that the contractor complied in all material respects with the specifications, and
3. Proof that the government knowledge of the hazards of the finished product was at least equal to that of the contractor."

The critical difference between *McKay* and *Agent Orange* is how the two tests approach the government's knowledge and conscious acceptance of a defective product. That is, *McKay* erroneously only requires the manufacturer to warn the government if the manufacturer has knowledge of the defect. This does not insure that the government, in fact, knows about the danger.

On the other hand, the *Agent Orange* test requires the government to have knowledge of the hazard (defect) equal to that of the contractor regardless of where the information may come from. There is no delineation between patent or latent hazards.

Clearly, knowledge on the part of the military of the defect is the thrust of the Government Contractor Defense. Therefore, the *Agent Orange* test is more in the ballpark of the policy theory behind the Government Contractor Defense.

Another difference between the *McKay* and *Agent Orange* tests is the degree to which the government may be involved in setting the product specifications. *McKay* seems to acknowledge some minimal level of government involvement below which the supplier should be held responsible for design defects. Yet, in conflict, further under the *McKay* test, mere governmental approval of the contractor's design will shield the supplier from liability, without showing knowledge of the defect in the approval by the government. The result is absurd and not in keeping with the policy that the government actually knows what defect it is buying for its own reasons. No such provision obtains in the original *Agent Orange* test.

In *Koutsoubos v. Boeing Vertol*, *supra* at 352-355, the Court announced a hybrid version. It formally adopted the *Agent Orange* test, above, *supra* at 355, but added further to the first part of the *McKay* "approval" reasoning. That is, as *Koutsoubos* said, "government approval of specifications developed through a continuous series of negotiations between the contractor and the military would satisfy the first prong of the (*Agent Orange*) defense, even though the majority of the specifications originated with the contractor." The Court unfortunately does not specify that the back and forth actually addressed the specific defect.

The second hybrid was announced in *Shaw v. Grumman Aerospace Corporation*, *supra* at 745. That Court's concern was whether or not the military actually made a decision to use a product that it knew to be dangerous to servicemen. Thus, they fashioned a test that a contractor may escape liability only if it affirmatively proves:

- "1. That it did not participate, or participated only minimally, in the design of those products or parts of the products known to be defective; or
2. That it timely warned the military of the risk of the design and notified it of alternative designs reasonably known by the contractor, and that the military, although forewarned, clearly authorized the contractor to proceed with the dangerous design." *Id.*

The Court felt that the first element of the test was fashioned to allow a military contractor to show when it actually worked jointly with military personnel in producing detailed specifications or that it was so minimal as to excuse it from proving the second part of the test. *Id.* at 746.

The *Shaw* Court went on to say that the second test to be proven by the Defendant by a preponderance of the evidence was that the contractor both warned the military of the risk of the product that it designed and informed the government of a design alternative reasonably known to the contractor. However, reasonable knowledge is not synonymous with omniscience. A risk is reasonably known when it is either actually known, or reasonably ought to be known, given good design practices in the industry. *Id.* at 746. The *Shaw* Court has come the closest to fashioning a workable test.

The Fourth Circuit, at variance to all other circuits, in *Tozer v. LTV Corp.*, *supra* at 408, adopted the *McKay* test, but applied *Koutsoubos* reasoning. The *Tozer* law was then applied in this case.

These conflicts in the various circuits are of no small import when considered in light of the different burdens of proof required of Defendants and also Plaintiffs in meeting the various tests.

For example, in some circuits the burden of proof is to show that the government knew the hazards associated with the specific design which later proved to be defective and causing injury. On the other hand, the other circuits only require that the manufacturer warn the government of defects it knows about or ought to know about. In other words, the government may have no knowledge of the defect and may have not made any conscious decision to purchase a defective product.

This is very expensive and dangerous for the government.

D.

DID THE COURT OF APPEALS ADOPT AN IMPROPER AND NON-FUNCTIONAL SET OF TESTS FOR THE GOVERNMENT CONTRACTOR DEFENSE AND THUS IMPROPERLY, FROM THE FACTS OF THE CASE, REVERSE THE JURY VERDICT BELOW.

1. Introduction

The Fourth Circuit Court of Appeals adopted the *McKay*, *supra*, criteria regarding the Government Contractor Defense and applied some of the *Koutsoubos*, *supra*, reasoning. (See 792 F.2d 413 (1986)).

However, if the defense is to be properly fashioned the following questions should be addressed:

1. Who (the government or the contractor) generated the specifications and who (the government or the contractor) generated the design of the product? Here, the jury concluded the responsibility was Respondent's (J.A. 466).

2. Did the United States Government accept the design of the product or did it accept the contractor specifications setting forth what the design is supposed to be? Here, the government and Respondent agreed by contract that the responsibility for defects was on Respondent (J.A. 495-496, 498).

3. Does the product conform to the design or the specifications? Here, the jury concluded it did not (J.A. 466).

4. Did the government knowingly accept the specific defect complained of? Here, there was no evidence it had.

5. Was the defect a "nut and bolt" defect or something on the cutting edge of technology inherently dangerous but necessary to the government? Here, they were elementary defects. (See STATEMENT OF THE CASE)

6. Is there a question of military mission or military discipline involved in the specific defect? Here, there was no evidence the defects were of military mission or discipline significance.

The *McKay* test does not warn the government of a particular defect, while the *Agent Orange* test does. In *McKay*, the manufacturer may hide behind ignorance or non-testing of a particular product and avoid liability merely by saying, "We didn't know about it".

Under *McKay* the burden of proof is on the Plaintiff to prove that the Defendant knew or should have known of a particular defect. The defense *should* require the Respondent to go forward with his evidence to meet the burden of proof. Under *McKay*, all the Respondent has to do is deny knowledge and the burden shifts to the Petitioner. Thus, there is no burden on the Respondent at all to prove an act of omission (*McKay*).

Tragically, under *McKay* and *Agent Orange*, if the contractor and the government are both ignorant of the defect; like a Catch 22, the defense stands and the contractor is protected. This does not promote the objective of enabling the government to knowingly accept a defect in a particular product for its own reasons.

The government, in its contract, has clearly put the responsibility for defects not known to it on the contractor. The contractor accepts said responsibility and agrees to correct all defects at its own expense (J.A. 494-498).

Koutsoubos, supra, reasoning also is flawed in that a back and forth discussion between the military and the manufacturer may not include discussion of the particular defect involved. The question is what was being considered in the back and forth, not the quantity of back and forth.

However, in *Shaw v. Grumman Aerospace, supra* at 744-746, the Court properly was concerned whether or not the military actually made a decision to use a product that it knew to be dangerous to servicemen. In other words, what is the nature of the defect. Is it the failure of an everyday "bolt" or "nut" or is it something truly on the cutting edge of technology. The former is an engineering error; the latter, a danger which must be made known to the government.

As stated in *Shaw*, the government's specifications may be minimal or detailed, quantitative or qualitative, general or specific; they may range from meticulous descriptions of each bearing and bushing required, to vague hopes for "simple" or "fail-safe" products. (778 F.2d 736, 746.) The central question is, did the military truly know what defect it was buying for its own reasons.

The *McKay* test does not insure such knowledge. Under the *McKay* test, the manufacturer may hide behind ignorance or non-testing of a particular product.

Shaw, supra, on the other hand, states that the contractor may escape only if its participation was minimal or that it warned of the particular risks, submitting alternative designs.

Shaw, supra, would be the best test to address all the issues and put it squarely on the government's shoulders to determine if they wished to accept a specific defect in a particular design for its own purposes. Military discipline and mission would thus be preserved.

Under any test, Petitioner would preponderate on the facts. (See STATEMENT OF THE CASE).

2. How Does The Government Contractor Defense Relate In This Case

Respondent would have it appear that the United States Government is the real Defendant here. The tactic is clever, but the deception should be transparent. Neither the United States nor the Navy are on trial in this case. The Respondent is UNITED TECHNOLOGIES CORPORATION (SIKORSKY), a private corporation in the business of designing, manufacturing, and selling civilian and military aircraft for profit.

The United States will not suffer any adverse financial impact from a judgment against Respondent. In fact, the initial contracts both for the A and D model helicopters (1968) in issue here included provisions for accident insurance during the testing program and correction of defects at the expense of the manufacturer (J.A. 494-498). In short, Respondent has already contracted to correct the defects and that was included in the purchase price.

Respondent will suggest that the design of the CH-53D was a joint effort by the Navy and Respondent. In some respects, it was. However, for the defects complained of, it was not. (See STATEMENT OF THE CASE)

The record reflects that the Navy named Respondent as the winner of a preliminary competition and let a contract giving certain general specifications (J.A. 529, 540). Respondent was to do the design and submit the design in the form of "detailed specifications" prepared by Respondent (Def. Ex. 18, 20). Respondent's "detailed specifications" are nothing more than what Respondent says the product is and will do. If it does not or the specifications do not accurately reflect the product, the government can not have knowingly accepted it.

Thus, the title "detailed specifications" is a misnomer—it is Respondent's design to comply with the government requests.

To be sure, Respondent was required to submit its design data and drawings to the Navy for review and release, but the contract expressly provides (under a heading entitled, "Design Responsibility") that:

"In releasing design data or drawings to the contractor, the government accepts no responsibility for the successful operation of the equipment manufactured by the contractor." (J.A. 495, 498).

In short, the CH-53D was designed by Respondent to meet the Navy's general requirements and requests. The Navy's role was checking the design data and drawings for completeness and compliance with the general requirements, but with the disclaimer of any responsibility for accuracy, completeness, or compliance with the proper functioning of the finished product (J.A. 495, 498).

The obvious reason for this approach to the design of the aircraft was that the Navy lacked the technical expertise to design the aircraft itself (which, as a matter of common sense, is why it contracted with Respondent for the design of the aircraft in the first place). The Navy was

simply one of Respondent's customers, a relatively sophisticated customer to be sure, but a customer nevertheless.

3. Is A Military Mission Or Discipline Involved In This Case?

Tragically, under *McKay, supra*, Respondent must warn of dangers that were known to the Respondent but not to the Government. If the supplier doesn't know of the danger, the test is met and the Government Contractor Defense applies. Unfortunately, this does not insure that the Government knows what it's bought.

Similarly, under *Agent Orange, supra*, the Government must have knowledge of the hazards which is at least equal to that of the contractor. If the contractor doesn't know about the danger or defect and the Government doesn't know about the danger or defect then the test is met again and the Government Contractor Defense applies. Unfortunately, again this does not insure that the Government knows that it has bought a defect creating danger to men and equipment.

Thus, these tests put on the entire military-Government procurement complex the responsibility of ignorance. Caveat emptor involving billions of dollars applies (Government beware).

Surely, in the case of mutual ignorance, the responsibility must fall on those who design the product, manufacture the product, test the product, and receive the payments and profits therefrom.

In none of the cases previously decided in the Circuit Courts, nor now presented here, has there been any military testimony that the failure of a part (a bolt, roll servo, escape system, etc.) had any mandatory military significance or military discipline involved.

The broad sweeping argument that military discipline and military missions would be compromised in questioning

defects, is so outlandish and insulting to the individual members of the military who must use these products, as to be ludicrous. It is risk taking enough on the members of the military to perform their vital functions, without supplying them with defective products which defects serve no military purpose.

Indeed, in the military aviation community, the military users of the products are ordered to report defects in the systems and aircraft which make them unflyable and unairworthy (R.T. 82). If they find a defect which makes the aircraft unworthy, they are by order of their superiors not to accept the aircraft for flight (R.T. 80-82).

There is no quarrel with the fact that military equipment may be used in a dangerous or hostile environment, but there has yet to be testimony of specific dangerous designs being the desire and requirement of the Government when requiring its military personnel to perform these dangerous missions.

The Courts do not need to question military decisions. The Courts only determine if the military *accepted a defect* for the military's own reasons. The *reasons* do not need to be examined by the Courts.

The Courts have indulged in wholesale speculation as to whether technology has been pushed towards its limits and thereby to incur risks beyond which those that would be acceptable for ordinary consumer goods. See *McKay, supra* at 449-450.

But what technology has been pushed to the limits? In each case, previously cited in the lower Courts and in the case here before the Court, the technology is ordinary and its application almost simplistic . . . the design of a servo whose forces cannot be overcome by the pilot under worst case malfunction and an escape system which does

not perform merely due to water pressure. This is not technology on the frontier but basic nut and bolt engineering which was not well thought out and performed by the company contracted to design it.

For as stated in the brief for the United States, Solicitor General, as Amicus Curiae, in *Shaw v. Grumman Aerospace Co.*, in the United States Supreme Court, No. 85-1529, page 14, "while the military is a sophisticated and competent participant in the process of design and manufacture, it is not always aware of all the risks that may be known to the contractor."

If the United States Government were capable of doing the designs of the systems in the first place, it would not need to contract for their design and manufacture.

Mere governmental approval of design does not mean that the design itself is correct for the requirement. Approval of a design, is not the same as designing it in the first place. Governmental approval is not engineering but acceptance of what *appears* to have been done.

E.

DOES A SOUND POLICY EXIST FOR THE GOVERNMENT CONTRACTOR DEFENSE SHIELDING THE MILITARY EQUIPMENT MANUFACTURER FROM PRODUCT LIABILITY OR NEGLIGENT DESIGN?

The United States purchases billions of dollars worth of equipment from government suppliers. The Government, by contract, requires the contractors to be responsible for the design and to correct it if faulty.

Yet, ironically, the Courts insulate the manufacture from being held accountable for defects by this defense. The Courts are remaking the contract of the parties. This is wrong.

1. The Feres-Stencel Doctrine

The basic premises underlying the theories behind the "Government Contractor Defense" is that it is designed to prevent the Government from paying the costs of injuries sustained by its servicemen. It is a parallel of the *Feres-Stencel Doctrine*, *supra*, that if Government contractors are liable to servicement for defective military products, the costs of those products will be passed on to the United States Government. See *McKay v. Rockwell International Corporation*, *supra* at 449.

However, *McKay* was decided more than two years before the United States Supreme Court case of *United States v. Shearer*, *supra*, wherein this Court makes it clear that the only relevant considerations in determining whether the *Feres-Stencel Doctrine* or the "Separation of Powers Doctrine" is implicated are "whether the suit requires a civilian court to second guess military decisions . . . and whether the suit might impair essential military discipline" — and that the other rationales for the doctrines which have appeared from time to time in the decisional law are "no longer controlling". *Shearer*, *supra*, at 44. See also *Johnson v. United States*, 749 F.2d 1530 (11th Cir. 1985), approved on en-banc hearing, 779 F.2d 1492 (11th Cir. 1986).

It should be noted that even if the *McKay's* misreading of *Feres* had survived *Shearer*, the "cost past through" rationale of *McKay* would provide no reason for a "military contractor Defense" in the instant case. Here, the Government insisted in its contract that Respondent *already* bare the cost of defects in its design or manufacture and placed the design responsibility squarely on Respondent (J.A. 495-496, 498). This was even back in 1968.

Also, as stated in *Shearer, supra*, at 1543: "The Feres doctrine cannot be reduced to a few bright-line rules; each case must be examined in light of the statute as it has been construed in Feres and subsequent cases." Obviously, this depends upon the facts of each individual case as to whether or not the status and injury of the serviceman was in the course and scope of his employment, etc.

2. Separation Of Powers-Bynum (Issue Of Knowledge Of Specific Defect And Military Significance Thereof)

The rationale of the separation of powers was introduced after *Shearer* in *Bynum v. FMC Corporation, supra*. The parties stipulated that the vehicle was manufactured in accordance with the government's precise design, there were no patent dangers known to the Respondent, and Respondent established by un rebutted affidavits that they had no knowledge of latent dangers.

The only issue on appeal was whether the manufacturer could be held responsible for the defective product that had been designed by the U.S. Government. The Court held that it could not. The *Bynum* Court recognized that the "Military Contractor Defense" must rest on a narrower foundation after *Shearer, supra*.

"Rather, to the *Shearer* Court, the central questions have become 'whether the suit requires the civilian Court to second guess military decisions and whether the suit might impair essential military discipline' " *Bynum, supra*, at 562.

However, the Fifth Circuit thereafter, "adopted the *McKay* test" but its adoption of the test was carefully qualified by the addition of the phrase, "at least insofar as it applies to the circumstances of the instant case." *McKay, supra*, at 567. The "circumstances" in *Bynum*

were far different than the circumstances here. In *Bynum*, the Government designed the product in issue (by stipulation), and the "innocent contractor" (770 F.2d at 566) merely manufactured it according to the Government design specification (by stipulation). As a result, *McKay* was followed on the facts in *Bynum* but the Court expressly left open the question of whether mere "approval" of a contractor's design by the Government would be sufficient to support the defense . . . and it opined in dictum that it would not:

" . . . Second, the military contractor must prove that the Government established reasonably precise specifications for the allegedly defective equipment and that the equipment conformed to those specifications. This element makes clear that Federal law provides no defense to the military contractor that mismanufactures military equipment or *is itself ultimately responsible for the design defect. . . .* " *Id.* at 574. (Emphasis supplied).

The Courts do not need to question military decisions. The Courts only determine if the military *accepted a defect* for the military's own reasons. The *reasons* do not need to be examined by the Courts.

3. Legislative Enactment

The "Defense Appropriations Act of 1984", Section 794, requires contractors to provide specific written "guarantees" covering workmanship, materials and performance. The act requires a guarantee that the contractor will bear the cost of all work and supply all parts necessary to achieve the performance specifications.

In *Brown v. Caterpillar Tractor Company*, 696 F.2d 246, 253 (3rd Cir. 1982) the Court implied, generally, Gov-

ernment specifications cannot be interpreted to require manufacture of a defective product.

"We believe the public interest in human life and health requires the protection of the law against the manufacturers of defective "products", whether they are to be used by members of the public at large or members of the public serving in our armed forces." *Foster v. Day & Zimmerman, Inc.*, 502 F.2d 867, 871 (8th Cir. 1974).

In addition, use of military aircraft by civilians occurs with great frequency. In *Schneider v. Lockheed Aircraft Corp.*, 658 F.2d 835, 838 (D.C. Cir. 1981), *cert. denied*, 455 U.S. 994 (1982), a military C5A transport plane evacuated Vietnamese orphans from South Viet Nam on behalf of a private organization. In *Ashland v. Link Ling-Temco-Vaught, Inc.*, 711 F.2d 1431 (9th Cir. 1983), a military C135 aircraft carried civilian scientists, technicians, civilian and Air Force employees, as well as, Air Force personnel. In *Schoenborn v. Boeing Company, supra*, a military helicopter carried civilian parachutists during an air show. Thus, military manufacturers have clearly foreseen use of their products by civilians where they are not insulated by the Government Contractor Defense.

These military aircraft manufacturers are already liable for and insured against injuries to civilians caused by the defective design of their products.

Liability imposed on the manufacturer promotes recalls, refittings and new warnings by manufacturers of the defective products. The manufacturer thus has the incentive to remedy the defect in other identical and similar products by altering the product's physical characteristics or warnings. In *Brown v. Caterpillar Tractor Company, supra* at 253, the Court implied that, generally, govern-

ment specifications cannot be interpreted to require manufacture of a defective product.

In addition, liability promotes safer designs by decreasing the net profit in unsafe products. The analysis of safety incentives in *McKay, supra*, at 451-2, is fundamentally flawed because it focuses solely on demand and implicitly assumes a market with one purchaser and one supplier. The United States government is not always the sole purchaser.

Liability deters unsafe designs by educating the industry. Litigation may require manufacturers to make public information which may improve the safety of an entire industry. In *Agent Orange*, several manufacturers were unaware of the health hazards associated with dioxin contamination (565 F.Supp. 1272-3). One manufacturer developed a test for dioxin contamination (*Id.* at 1269-70). Another manufacturer eliminated dioxin from its product (*Id.* 1274). Thus, elimination of this health hazard was and is technically and economically feasible. Yet, absent this litigation, these military manufacturers did not share this information, or, with one exception, eliminate this defect. Clearly, the added incentive of products liability is needed. (Accord, *Foster v. Day and Zimmerman, Inc., supra* at 871.

F.

THE FACTS IN THIS CASE UPHOLD JUDGMENT FOR PETITIONER UNDER EITHER THE GOVERNMENT CONTRACTOR DEFENSE GIVEN OR ONE FASHIONED BY THIS COURT.

The facts in the STATEMENT OF THE CASE support the jury's determination of Respondent's liability under any statement of the Government Contractor Defense applied by this Court.

The government, in its contract, agrees with the contractor that the responsibility for the design and the responsibility to correct the defects which appeared in this case are the Respondent's (J.A. 495-496, 498).

The jury unanimously concluded that the specifications were not reasonably precise and that the defects had not been approved by the government regarding the override forces on the servo and the emergency egress system.

In addition, the jury was instructed under the more conservative *Agent Orange* rule wherein the Navy had to know as much or more than the Respondent about the helicopter's hazards from any source. Respondent, did not convince the jurors that the United States knew about the override forces (since Respondent had not told them about it) nor that the egress system was in conformance to the government's desires. The jury heard the evidence and they decided against the Respondent under stricter requirements than *McKay* or *Shaw*.

Therefore, either way that this Court decides, the jury's verdict should be upheld and the judgment reinstated.

VII.

CONCLUSION

Petitioner requests, in the alternative, that the Fourth Circuit Decision be reversed and the Judgment be reinstated or the case be remanded for trial in accordance with the opinions expressed by this honorable Court settling the question of the Government Contractor Defense.

Respectfully submitted,

/s/ Louis S. Franecke, Esq.

MACK, HAZLEWOOD,
FRANECKE & TINNEY

RESPONDENT'S BRIEF

NO. 86-492

Supreme Court, U.S.

FILED

MAY 21 1987

JOSEPH F. SPANTOL, JR.
CLERK

IN THE
Supreme Court of the United States

October Term, 1986

DELBERT BOYLE, Personal Representative Of The
Heirs And Estate Of David A. Boyle, Deceased,
Petitioner,
v.
UNITED TECHNOLOGIES CORPORATION,
Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT
OF APPEALS FOR THE FOURTH CIRCUIT

BRIEF FOR THE RESPONDENT

LEWIS T. BOOKER
(COUNSEL OF RECORD)
RICHARD H. BURTON
LONNIE D. NUNLEY, III
Hunton & Williams
Richmond, Virginia 23212
(804) 788-8200

Counsel for Respondent

Of Counsel:

PHILIP A. LACOVARA
MARK A. DOMBROFF
JOHN D. ECHEVERRIA
Hughes Hubbard & Reed
Washington, D.C. 20004
(202) 626-6200

W. STANFIELD JOHNSON
Crowell & Moring
Washington, D.C. 20004
(202) 624-2500

May 21, 1987

BEST AVAILABLE COPY

QUESTIONS PRESENTED

1. Does the military contractor defense, as a matter of federal law, preclude courts from holding a contractor liable for injury resulting from allegedly improper design of a military product manufactured in strict compliance with specifications established or approved by the government?

2. Did the court of appeals properly apply the military contractor defense to the facts of this case?

RULE 28.1 LISTING

United Technologies Corporation has no parent corporation. As of April 10, 1987, no corporate entity owned an equity interest in United Technologies Corporation of five percent (5%) or more.

United Technologies Corporation does own voting securities in a large number of domestic and foreign corporations. A list of those corporations and their respective States or countries of incorporation is attached as Appendix 1 to this brief.

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IN THE Supreme Court of the United States

October Term, 1986

No. 86-492

DELBERT BOYLE, Personal Representative Of The
Heirs And Estate Of David A. Boyle, Deceased,

Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES
COURT OF APPEALS FOR THE FOURTH CIRCUIT

BRIEF FOR THE RESPONDENT

I

STATEMENT

Petitioner's statement of facts is in three categories, corresponding to three alleged causes of Lt. David Boyle's death on April 27, 1983, following a helicopter crash. Because two of those three issues are not properly before this Court, the facts as to those issues will be restated only briefly. The third issue—the design of the emergency escape hatch—is the only issue properly before this Court. The facts relating to the helicopter and the accident warrant brief summary also.

A. THE BACKGROUND OF THE HELICOPTER

The CH-53D helicopter aboard which Lt. Boyle was copilot at the time of his death is a large assault transport

helicopter specifically designed for heavy duty service in transporting equipment and personnel to support U.S. Marine ground forces in amphibious assault combat operations in any geographic environment (J.A. 545). The design configuration of the helicopter was the product of a military procurement process in which the Navy: (a) specified its requirements; (b) worked jointly with the contractor on the detailed design specification; (c) reviewed the helicopter configuration in the development process—for example, by examining mock-ups prepared specifically for the purpose of Navy review; (d) analyzed and tested prototype units; (e) approved the design configuration for production; (f) established the design configuration as the Navy specification for production and required production to the specified design; (g) allowed changes to that design only when approved by a Navy Aircraft Configuration Control Board; (h) tested and finally accepted production helicopters manufactured to the design configuration; and (i) subsequent to final acceptance, operated, maintained, overhauled, and revised the configuration of the helicopters.

Several hundred CH-53 helicopters, some designated as model CH-53A and others as model CH-53D, were built and placed in service from 1966 through the early 1970's. The CH-53 flew thousands of flights during the Vietnam conflict in support of combat missions by United States Marines.

The Navy initiated the procurement process for the new helicopter in 1962 by publishing a document entitled "Type Specification for Assault Transport Helicopter H-H(X), TS-156" (the Type Specification) (DX-14; J.A. 544). The Type Specification, along with other pre-existing Navy specifications applicable to all types of Navy helicopters (DX-11; J.A. 514), established the basic design and performance requirements for the new helicopter.

After developing these specifications, the Navy solicited proposals from all the major helicopter manufacturers in the United States. Based on its review of the technical features, design concepts and cost of each proposal, the Navy selected

the Sikorsky Aircraft Division of the United Aircraft Corporation (now respondent United Technologies Corporation) to build the new helicopter. (For convenience, respondent will be identified as Sikorsky).

The Navy and Sikorsky worked together to produce more detailed specifications for the design of the new helicopter (J.A. 292-93). These discussions produced the "Detail Specification for Model CH-53A Helicopter" (the Detail Specification) (J.A. 529), which the Navy officially published in November, 1962. Based on these hundreds of pages of specifications as well as the specifications previously prepared by the Navy, the Navy and Sikorsky entered into a contract in February, 1962, for development and possible production of the helicopter. The contract provided that the Navy could unilaterally alter the design specifications for the helicopter at any time. However, Sikorsky could not modify the design without submitting proposed changes to the Navy's Aircraft Configuration Control Board and securing the Board's approval.

In accordance with the detailed process called for in the contract, the Navy and Sikorsky worked in tandem to develop a final product acceptable to the Navy. As is customary with the development and production of weapons systems for the Pentagon, the Navy maintained a staff of government engineers at the Sikorsky plant in Connecticut throughout the development program to monitor the development and testing of the helicopter (J.A. 298). In addition, the Navy required Sikorsky to provide extensive data and reports concerning the development of the aircraft. As part of the development process, Sikorsky produced and the Navy closely examined a mock-up of the aircraft cockpit and two prototype helicopters. Only after the Navy required certain modifications in the design pursuant to this process did the Navy exercise its option to have Sikorsky actually commence production of the CH-53A helicopter. That 1966 decision expressly directed that the "Model CH-53A helicopters to be furnished hereunder shall be in accordance with" the 1962 Detail Specifications, as

modified by 55 specified change orders made by the Navy (DX-18).

In 1968, at the height of the Vietnam war, the Navy decided to develop the CH-53D model. That model was essentially identical to the CH-53A, except that the new model had larger engines and was capable of carrying heavier loads. The Navy again selected Sikorsky to build this model of the helicopter. Like the process they had used in developing the design for the CH-53A, the Navy and Sikorsky worked jointly on the detailed specifications for the CH-53D (J.A. 296-97, 540; DX-13). In December, 1968, the Navy and Sikorsky entered into a contract for the production of 124 CH-53D helicopters. Like the earlier contract, the Navy required Sikorsky to manufacture the CH-53D "in accordance with" the Navy's original Detail Specifications, as modified by 125 change orders. (DX-20; J.A. 569). As with the earlier contract, the Navy reserved "sole authority" to change the design specifications (J.A. 302-03; 569).

This case arises from the crash of a CH-53D helicopter. Before accepting that particular helicopter (or any others), the Navy in June, 1970, followed its standard practice of testing the aircraft and determining that it actually conformed with the applicable specifications (J.A. 574). Sikorsky did not see the helicopter again for 13 years, until after the accident that gave rise to this litigation (J.A. 305).

B. THE ACCIDENT

The helicopter crash landed in the Atlantic Ocean just off Virginia Beach, Virginia, around noon on April 27, 1983, a clear day. At the time of the crash the helicopter was involved in a joint Navy-Marine training exercise. The helicopter had been flying since early that morning. Cpt. Burt Tussing was pilot in command. Lt. David Boyle, a Marine on active duty, was copilot. Staff Sergeant Charles Tubbs was crew chief. One passenger was also aboard.

Lt. Boyle, who apparently had not landed a helicopter aboard a ship known as an L.P.D. (landing platform, dock)

before, was being trained by Cpt. Tussing to make such landings (J.A. 111). As they approached an L.P.D., the USS SHREVEPORT, for the practice landing, Cpt. Tussing realized that an attempt to land his helicopter would interfere with another helicopter landing on the SHREVEPORT. Lt. Boyle, who was flying the helicopter at that time, decided to abort the landing attempt and perform a "wave off" maneuver (J.A. 113). At that point the helicopter was proceeding slowly at a low altitude.

Lt. Boyle's training was to make a left turn during a wave off; Cpt. Tussing realized that it would be necessary to make a right turn. He accordingly told Lt. Boyle that he was taking over the controls, since he was seated on the right side of the helicopter and could see in the direction of the turn. However, Lt. Boyle apparently did not understand that message. After Cpt. Tussing said that he was taking over the controls, Lt. Boyle said that he could not get enough control to turn the helicopter left, opposite to the direction in which Cpt. Tussing was attempting to turn (J.A. 142). The crew chief overheard that conversation on his internal communications system (J.A. 194).

A Sikorsky test pilot who as a Marine pilot in Vietnam had flown that same type of helicopter heard the trial testimony of the crew chief and read the Investigating Officer's report of the accident and an article written by Cpt. Tussing about the accident. He explained what apparently happened that day (J.A. 422-423):

Q. What happens when one pilot is trying to turn right and the other pilot is trying to turn left?

A. If they pull at the same amount, nothing. The aircraft will sit there.

Q. Suppose, one of them were suddenly to release the controls?

A. Oh, boy. That would be like somebody dropping the emergency brake off on the car when you hit the gas. It would roll good. It would roll in that direction, in a hard over the direction the guy was pulling.

The crash landing was a survivable one. The other three men aboard escaped safely, using their assigned escape routes. Lt. Boyle, however, did not go out the copilot's emergency escape hatch located just inches from his seat. Instead he removed his seat belt, left his seat and went out of the cockpit into the main cabin of the aircraft. He was found in the main cabin, his leg tangled in some unstowed ropes (PX-1).

C. THE IRRELEVANT FACTUAL CONTENTIONS OF THE PETITIONER

1. The Origin Of The Chip

Petitioner argues that a small metallic chip found during the post-accident inspection of the helicopter's Automatic Flight Control System (AFCS) caused a part of the AFCS known as a servomechanism, or servo, to jam, and that this in turn caused the helicopter to go out of control and hit the water. The evidence for Sikorsky at trial showed four things as to that contention. First, the chip found in the AFCS servo during the inspection would not have caused the loss of control described by Cpt. Tussing. Secondly, even had the chip caused the malfunction of the AFCS, which it did not, Sikorsky was not responsible for the chip in the servo. Third, the AFCS was a totally redundant system, so the pilot could have immediately switched to another flight control system which was not jammed. And finally, whatever the cause of the crash landing, it was a survivable one. No one sustained any injuries when the helicopter landed on the water. Thus, any speculation why the helicopter went into the water is irrelevant. The sole issue is the emergency escape system.

The United States Court of Appeals for the Fourth Circuit addressed the second item of Sikorsky's evidence and found that sufficient to warrant reversal of the trial court. It held that Petitioner had failed to meet his burden under

Virginia law to prove which of several possible causes for an accident was most probably the responsible one.¹

Sikorsky had delivered the helicopter to the Navy in 1970. It overhauled the servo, which was returned to it separately from the helicopter, in early 1982. On at least two separate occasions after Sikorsky's overhaul, however, the Navy opened up the servo under conditions that could have introduced the chip (J.A. 347, 354, 365). The first time was when the servo was returned to the Pensacola Naval Air Rework Facility (NARF) in late 1982 for overhaul. The second time was when the servo was installed on the helicopter some time after its return from Pensacola.

In holding that Petitioner's proof of liability failed as a matter of law, the court of appeals correctly applied Virginia law as announced in *Logan v. Montgomery Ward & Co.*, 216 Va. 425, 219 S.E.2d 685 (1975). Petitioner has advanced no argument to suggest why this Court should depart from its settled practice of declining to re-examine issues of state law decided by the court of appeals for the circuit which includes the state whose law is being applied. *Butner v. United States*, 440 U.S. 48, 51, 57-58 (1979).

¹ Petitioner's brief asserts (at 11) that Sikorsky engineer Roderick MacLennan admitted that the most probable source of the metallic chip was Sikorsky. As the court of appeals necessarily concluded, however, that is simply not so. When MacLennan was asked his opinion whether, on the basis of all the facts, it was more likely that the chip was introduced by Sikorsky or by the Navy, he testified without qualification that it was more likely that Navy personnel had introduced it (J.A. 354).

On cross-examination, however, Mr. MacLennan was asked to disregard the fact that Navy personnel had actually reworked the servo and to assume instead that after Sikorsky's rework the Navy had merely reinstalled the servo without further work on it (J.A. 363). Based on that incorrect scenario, Mr. MacLennan speculated that there would have been only a low probability that the Navy would have introduced the chip into the servo merely through reinstallation (J.A. 365). The answer to that hypothetical question, however, did not change the status of the undisputed evidence on which the court of appeals relied, evidence which showed that the Navy had actually performed the last service on the servo.

2. The Automatic Flight Control System

Petitioner also contends (Petitioner's brief at 11-16) that the helicopter's AFCS was defectively designed and that that defect was not called to the attention of the Navy. The district court found there was no submissible evidence of any defective design of the flight control system.² The court's jury charge made it clear that the design of the servo system was not submitted to the jury.³

Although counsel for Petitioner did make several objections to the charge, at no time did counsel object that the district court failed to charge the jury as to any design defects in the AFCS (J.A. 443-448; 466). Thus, as Rule 51, Fed. R. Civ. Proc., mandates and as both sides recognized when they described the issues before the court of appeals, the design of the flight control system was not an issue in the court below (J.A. 6; Petitioner's brief in the court of appeals at 3). Accordingly, that issue is not properly before this Court. *See Kosak v. United States*, 465 U.S. 848, 850 n.3 (1984).⁴

² The judge ruled:

Now, on the manufacture, *other than the design, on the design characteristics of it*, I am letting that go on the location of the collective stick and the handle for the emergency exit.

The other thing that I am really letting go to the jury is the re-manufacture of the servo and not the original manufacture. . . . (J.A. 442-443) (emphasis added).

³ The judge then charged the jury:

In this case the plaintiff claims the defendant was negligent in its design of the co-pilot's egress system and/or the reworking of the Moog valve of the AFCS servo and that one or both of these negligent acts was the proximate cause of the death of David Boyle.

* * *

. . . . In this case plaintiff claims defendant, U.T.C., breached the implied warranty of merchantability by a design defect in the co-pilot's egress system and/or by a defect in the re-working of the AFCS servo. It is up to you as the jury to determine whether the helicopter contained a design or re-work defect. (J.A. 458, 459, 461).

⁴ Moreover, the evidence before the district court conclusively showed that, in light of the way the helicopter crashed, the flight control system had not failed (J.A. 75, 196, 375-76, 417). The crew chief standing in the rear of the helicopter was not knocked off his

D. THE EMERGENCY ESCAPE HATCH

The issues actually before the Court focus on the helicopter's emergency escape hatch. The emergency escape hatch system was prescribed by the Department of the Navy, not Sikorsky. In particular, SD-24H, the Navy general specification applicable to all helicopters, provides in part (DX-11; J.A. 492):

3.7.1.7.1 MANUAL ESCAPE EXITS.

Manual escape exits shall be provided as necessary to permit ready and safe egress of rotary wing aircraft occupants in an emergency. All hatches, doors, windows, or ports, which are to be used as emergency escape exits, shall be quick opening, easily operable, and shall be jettisonable when in the fully closed position, the fully open position, and in any intermediate position between fully closed and fully open.

An expert witness, testifying for the plaintiff over objection, found fault with the copilot's escape hatch system. He contended that the hatch design was defective because it opened outward rather than inward. Although he had never flown a helicopter, he also contended that when one of the flight controls, the collective,⁵ was in a full up position it could

feet, as he surely would have been had the control system failed and caused a violent right roll (J.A. 375-376). None of the many other aircraft in the area observed the violent maneuver which the helicopter would have undergone had the flight control system failed (J.A. 417). Post-crash tests showed that the controls were still operable even though the accused chip was in them (J.A. 64-66, 72, 356-358). Moreover, the CH-53D has a completely redundant and duplicative flight control system. *See, e.g.*, pp. 2-2, 2-7 and 2-8 of PX-73. The AFCS can immediately switch to a backup servo if the one being used at the time fails in flight (J.A. 309-10). Finally, Petitioner's contention that the shear pin which allows the pilot to regain control of the aircraft was connected only to one of the two flight control systems is in error. There is a shear pin on all systems (PX-73, pp. 2-2, 2-7 and 2-8).

⁵ Helicopters have two stick-like controls which pilots use to control the helicopters' movements. The cyclic moves the helicopter forward, backward and sidewise and is located in front of, and between the legs of, the pilot and the copilot. The collective moves

interfere with the copilot's access to the emergency escape hatch knob (J.A. 237-238). On cross-examination Petitioner's expert admitted that the term jettison used in the applicable Navy specification meant to throw the hatch out (J.A. 240). He also identified the United States Army Aircraft Crash Survival Design Guide and acknowledged that it provided that unless an aircraft is pressurized—this helicopter was not—emergency exit closures should be arranged to fall free and to be pushed easily outward for side exits (J.A. 243). The Guide states the reason for outward jettisoning:

To remove the exit closure inward would add to the congestion and impede escape.

Rescue from the outside is a major reason for having the windows drop outward rather than inward. That is made clear from the Navy specification applicable to all aircraft (J.A. 518-519):

3.7.1.3.1.1 COCKPIT ENCLOSURES

... External emergency movable sections releases shall be provided on both left and right sides. ... All external movable sections control handles and doors shall be suitable for operation by personnel wearing fire fighters insulated gloves.

Thus, the emergency escape hatch design complied in all respects with applicable Navy and, indeed, service-wide requirements. There are three clear and logical reasons for outward jettisoning: (1) it minimizes congestion for the crew in escaping, (2) it aids rescuers outside the aircraft in gaining access to the crew quickly in event of a crash and (3) it assures consistency in configuration among military helicopters for emergency workers who might not be intimately familiar with each individual aircraft.

In the same fashion, the Navy's acceptance of the mock-up cockpit approved the location of the collective control and its relationship to the emergency escape hatch knob (J.A. 301-302). Furthermore, the photographs intro-

the helicopter up and down and is located to the left side of the pilot and copilot.

duced at trial show that there was ample access to the emergency escape hatch knob in whatever position the collective was located (J.A. 580-581).

Although the design of the escape hatch actually selected by the Navy would obviously be safer in virtually any emergency, Petitioner theorizes that Lt. Boyle may have been prevented from opening the hatch by the water pressure outside the helicopter. In addition, Petitioner contends that in certain positions the handle of the copilot's flight control stick (the collective) might have limited access to the emergency escape hatch (J.A. 236-38).

It would be hard to view the outward-jettison feature as a design defect. Cpt. Tussing did escape safely by pushing his hatch out against the water, even though the helicopter was rolling in the water and his hatch, too, was almost entirely submerged. He pulled the escape hatch knob, the hatch fell out, and he escaped (J.A. 122-23).⁶

Finally, if the outward-jettison feature of the escape hatch system presented problems—even in particular circumstances—they were as self-evidently observable by the Navy as by Sikorsky. The Navy examined both a mock-up of the helicopter and two prototype aircraft and was obviously aware that the escape hatch was designed to be jettisoned outward, including in emergencies in the water. The Navy did not request any relevant modifications to the emergency

⁶ Petitioner argues that Lt. Boyle must have tried to open his escape hatch but could not get it open. The escape hatch knob, however, included a very light shear wire designed to demonstrate whether it had been opened, but examination after the accident showed that no attempt had been made to open it. The wire was unbroken (see Stipulation of Facts, p. 2).

Nevertheless, Petitioner speculates that Lt. Boyle must have tried unsuccessfully to pull the escape knob, because there were scratches on the back of his hand which, Petitioner argues, must have come from rubbing up against the shear wire when Lt. Boyle was attempting to open the escape hatch. That speculation too must fail, since Lt. Boyle was wearing heavy flight gloves at the time (J.A. 98).

escape hatch based on those examinations (J.A. 301-02). Similarly, photographic evidence confirmed the trial testimony showing that the copilot had adequate access to the escape knob in whatever possible position he may have left the collective (J.A. 428, 580-81).

Indeed, the Navy, without consulting Sikorsky, added a new device atop the collective control stick of CH-53D helicopters in 1979 or 1980 to divert heat seeking missiles (J.A. 424-428). This helicopter was fitted with such a device. That narrowed the access space to the escape hatch knob. The Navy apparently thought that narrowing posed no hazard to the copilot. If that did in fact create a hazard, though, the Navy knew about it and Sikorsky did not. Surely Sikorsky had no duty to warn the Navy of a condition created by the Navy without consultation with Sikorsky.

The decision of the court of appeals, however, did not turn on any of these issues of "defect" or causation. Rather, the court concluded that, as Sikorsky had argued in the trial court as a matter of law (J.A. 282-83, 441-42, 448), Sikorsky "had satisfied the requirements of the military contractor defense," and therefore "it can incur no liability for negligence or breach of warranty for the alleged defective design." 792 F.2d at 415. Thus, the ultimate issue presented by this case is whether Sikorsky's compliance with the government-approved—and, indeed, government-required—specifications exposes Sikorsky to suit for alleged design defects.

E. THE CHARGE TO THE JURY

The trial court submitted two issues to the jury—the allegedly defective reworking of the AFCS servo by Sikorsky and the alleged design defect in the copilot's emergency escape system (J.A. 461). Sikorsky had moved for a directed verdict in its favor both at the conclusion of the plaintiff's evidence and again at the conclusion of all the evidence, contending that there was no evidence that Sikorsky was responsible for the alleged rework defect in the servo and that there was no conflict in the evidence that Sikorsky had made out each element of the military contractor defense (J.A.

282, 441-442). The court overruled the motion on both occasions (J.A. 282-283, 442).

When the court announced that it would submit the issues of the reworking of the servo and the alleged design defect in the emergency escape hatch to the jury, Sikorsky once again objected to the charge, contending that there were no issues to go to the jury (J.A. 448). Once again the court overruled Sikorsky's objection and proceeded to instruct the jury on those issues (J.A. 451-464).

II

SUMMARY OF ARGUMENT

When issues not properly before this Court are separated out, one issue remains for resolution: Is the military contractor defense applicable to this case, and if so what are its elements? The military contractor defense is an affirmative defense, to be pleaded and proven by a defendant manufacturer of equipment in a product liability case where the design of the equipment is alleged to be defective. The defense relieves the manufacturer of the product from tort liability where the manufacturer proves the allegedly defective design was established or approved by the United States. The defense arises whenever there is a reasonable likelihood that decisions by the military in establishing or approving the design of military equipment will be called into question in the litigation.

While the issue of liability for the design of military equipment seems manageable now, the judicial system would face severe disruption in time of full military mobilization if service personnel could ask civilian courts to second-guess the military as to a military design alleged to have caused injury. A clear affirmance and restatement of the military contractor defense obviates that problem.

Beginning with *Feres v. United States*, 340 U.S. 135 (1950), and continuing through *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666 (1977), and *United*

States v. Shearer, 473 U.S. 52 (1985), this Court has consistently held that second-guessing military orders and decisions is an improper intrusion of the judiciary into the decision-making process of the Executive Branch. In this case, the trial court permitted a six-person lay jury to decide whether an emergency escape hatch system on a Marine assault helicopter constructed in strict accordance with plans and specifications established and approved by the United States Navy was nevertheless defective in design.

This case, then, restates exactly the same problems this Court has identified since 1950. A jury was permitted to substitute its own judgment for the considered design decisions made by the military. To rebut the allegations of design defects military officials would be called upon to testify in court about a design decision made by the Department of the Navy in the 1950's and followed consistently since then. Permitting or requiring military officials to justify their decisions, and then letting a jury pass on those decisions, is precisely the type of second-guessing this Court has found impermissible on other occasions.

The various courts of appeal which have considered the defense have generally identified three elements as essential to the defense: (1) the United States established or approved reasonably precise specifications for the equipment; (2) the equipment conformed to those specifications; and (3) the supplier warned the United States about dangers involved in the use of the equipment which were known to the supplier but not to the United States.

The Fourth Circuit, applying that formulation to the facts of this case, concluded that Sikorsky had proven each element. Because that formulation is essential to fairness, is a workable test, honors constitutional notions of separation of powers and is consistent with long-standing precedent in this Court, the judgment of the court of appeals should be affirmed.

The result reached by the court below does not offend traditional notions of tort liability. To the contrary, it is simply

an application of long-standing principles of American law. Among them are recognition of the federal interests in military procurement, the importance of preserving the separation of powers among the branches of government in preference to having the judicial branch correct perceived errors in judgment by the executive or legislative branches and the recognition since Revolutionary times of the special relationship between military personnel and the government. The military contractor defense also comports with the common law concepts that an agent is not responsible for the acts of his principal and that there is no tort liability to individuals injured in performing certain types of work.

The tort concepts of liability for breach of implied warranty to remote users and of strict liability are of recent origin, primarily finding their sources in the Uniform Commercial Code, promulgated and adopted in the 1950's and 1960's, and in § 402A of the Restatement of Torts, Second, approved in 1964. The military contractor defense once again demonstrates the genius of the common law in striking a fair balance between these new tort doctrines and well-established principles of separation of powers.

The other issues urged by the Petitioner—review of a Fourth Circuit decision on application of Virginia product liability law and decision of an issue relating to the design of the flight control system which was not submitted to the jury by the trial court—are not properly before this Court and should not be considered. But if this Court chooses to consider them, the judgment in the former instance of the court of appeals and in the latter instance of the United States District Court for the Eastern District of Virginia are plainly right and should be affirmed.

III

ARGUMENT

A. THE MILITARY CONTRACTOR DEFENSE
SHIELDS A CONTRACTOR FROM LIABILITY RE-
SULTING FROM ALLEGEDLY IMPROPER DESIGN
OF A MILITARY PRODUCT FOR WHICH THE
GOVERNMENT ESTABLISHED OR APPROVED THE
SPECIFICATIONS

1. The Military Contractor Defense Presents
An Issue Of Federal Law

The military contractor defense presents a question of federal law. While the court of appeals did not address the issue, the petition assumed, properly, that the important federal interests at stake justify recognizing the defense and defining its contours as a matter of uniform federal law.

In the past, this Court has exercised its authority to fashion federal common law when "necessary to protect uniquely federal interests[.]" *Texas Industries, Inc. v. Radcliff Materials, Inc.*, 451 U.S. 630, 640 (1981), quoting *Banco Nacional de Cuba v. Sabbatino*, 376 U.S. 398, 426 (1964). In considering whether to adopt a federal rule of decision, the Court has also considered the effect applying disparate state law would have on the federal interests at stake, as well as the extent to which preemption by federal law may interfere with important state interests. See *United States v. Kimbell Foods, Inc.*, 440 U.S. 715 (1979).

Applying these standards, most of the lower courts that have discussed the issue have concluded that the military contractor defense is a matter of federal law, even if the plaintiff's claim itself arises under state law. See, e.g., *Bynum v. FMC Corp.*, 770 F.2d 556, 567-74 (5th Cir. 1985); *In re "Agent Orange" Product Liability Litigation*, 580 F. Supp. 690, 701-05 (E.D.N.Y. 1984); *In re Related Asbestos Cases*, 543 F. Supp. 1142, 1151 (N.D. Cal. 1982); but see *Brown v. Caterpillar Tractor Co.*, 696 F.2d 246, 247-49 (3d Cir. 1982). Of course, when the plaintiff's claim arises under federal law, because, for example, the accident occurred on the high seas,

there is no dispute that the defense is governed by federal law. See *Tozer v. LTV Corp.*, 792 F.2d 403, 409 n.3 (4th Cir. 1986), petition for cert. filed, 55 U.S.L.W. 3416 (U.S. Oct. 23, 1986) (No. 86-674); *Koutsoubos v. Boeing Vertol*, 755 F.2d 352, 354 (3d Cir. 1985), cert. denied, 106 S. Ct. 72 (1985).

The military contractor defense implicates a number of important, uniquely federal interests. First, recognition of the defense is necessary to preserve the federal system of separation of powers. Several lower courts have upheld the defense based on the separation of powers doctrine. The courts recognized that they lack the authority to intrude upon the responsibility of the executive and legislative branches for conducting the nation's military affairs, including the specialized but subtle judgments made in procuring materiel for the national defense. The critical federal interest in the separation of powers doctrine mandates that the validity and scope of the defense be resolved as a matter of federal law. As the Court stated in *Sabbatino*, above, 376 U.S. at 424, a case involving separation of powers concerns, "[w]hatever considerations are thought to predominate, it is plain that the problems involved are uniquely federal in nature."

Second, this determination has an important bearing on the federal government's responsibility for equipping United States military forces. In determining its unique equipment needs, the military must give preeminent importance to combat effectiveness while also striving to protect our troops and to control procurement costs. Unlike ordinary consumer products, military products are typically designed for inherently dangerous purposes and for use in the most demanding of conditions. As one court of appeals explained, "[o]ften dangerous designs must be used in the military context to meet the exigencies of our national defense, and even military equipment that is relatively safe for every day use may have to be operated on occasion under dangerous conditions or in a manner creating a high risk of harm." *Bynum v. FMC Corp.*, above, 770 F.2d at 569.

Deciding the proper balance among competing, often conflicting goals is the exclusive responsibility of the federal government. Article I of the Constitution assigns to Congress the responsibility for raising, supporting, regulating and equipping the armed forces. Article II entrusts to the President the responsibility for directing the armed forces in keeping the peace or winning any war. As the Court established many years ago:

. . . [A]mong the powers assigned to the National government, is the power "to raise and support armies," and the power "to provide for the government and regulation of the land and naval forces." The execution of these powers falls within the line of its duties; and its control over the subject is plenary and exclusive.

Tarble's Case, 80 U.S. 397, 408 (1871). All military procurement policies, priorities, and programs emerge from the interplay between the two federal elected branches.

Third, this Court's action on the military contractor defense will have a substantial bearing on the contractual relations between the military departments and their suppliers of military equipment. In *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666 (1977), this Court recognized that the "relationship between the Government and its suppliers of ordnance is certainly no less 'distinctively federal in character' than the relationship between the Government and its soldiers." *Id.* at 672, quoting *Feres v. United States*, 340 U.S. 135, 143 (1950). Any suit against a military contractor based on alleged design defects in military equipment arises directly out of the contract between the military and its supplier and typically challenges a design decision reflected in a federal contract and approved by officers of a military department.

Thus, what the Court decides about the military contractor defense will have an important bearing on future relations between the federal government and its contractors, including the willingness of military contractors to contribute their expertise to the design process when their involvement may subject them to liability. The legal consequences of that

relationship are inherently a matter of federal concern. *Cf. United States v. Standard Oil Co.*, 332 U.S. 301, 305-06 (1947) ("the scope, nature, legal incidents and consequences of the relation between persons in [military] service and the Government are fundamentally derived from federal sources and governed by federal authority").

Finally, the military contractor defense is a matter of uniquely federal concern, since its resolution will have a direct and immediate impact on the federal treasury. *Cf. Clearfield Trust Co. v. United States*, 318 U.S. 363, 366 (1943). Since the United States Government is the primary customer for most military equipment, much of the financial burden of contractor liability would ultimately be absorbed by the federal government. The cost to the federal government of equipping and maintaining the military already is enormous. *See, e.g.,* Office of Management and Budget, *The United States Budget in Brief* at 34 (1987) (1986 budget authorization for the military was \$286.1 billion). It is obviously a matter of significant federal interest whether to recognize or reject a defense that directly relates to federal procurements.

By contrast, ceding to state law control of the military contractor defense would seriously threaten these important federal interests. The law adopted in certain jurisdictions might give insufficient weight to the separation of powers concerns that support the defense, such as by allowing local civilian juries to second-guess a military decision to emphasize combat effectiveness rather than maximum safety. These concerns cannot properly be left "to divergent and perhaps parochial state interpretations." *Sabbatino*, above, 376 U.S. at 425.

Recognizing the military contractor defense as federal common law would not disrupt important state interests, especially when measured against the important federal interests at stake. While the states have primary responsibility for protecting their citizens against defective consumer products, that responsibility does not give states direct power to regulate the design of military products approved and purchased

by the federal government. Nor do the states have any legitimate interest in doing so indirectly by giving local juries that kind of role.

Moreover, the Defense Department assigns military personnel to duties not only around the country but around the world. Thus, the site of an accident involving active-duty service personnel—if within the borders of any state—is often fortuitous. In modern choice-of-law terms focusing on “interests analysis,” it would be hard to identify any real state interest in controlling the standards for military products that may endanger soldiers in transitory assignments. As the Court explained in deciding that federal common law controls the government’s right to indemnification for injury to servicemen, there is no reason why the existence or scope of such a right “should vary in accordance with the different rulings of the several states, simply because the soldier marches or today perhaps as often flies across state lines.” *United States v. Standard Oil Co.*, above, 332 U.S. at 310. See also *Stencel Aero Engineering Corp.*, above, 431 U.S. at 672; *Feres v. United States*, above, 340 U.S. at 143.

Finally, the few courts that have assumed that the military contractor defense turns on state law have, nevertheless, recognized the validity of the defense. See, e.g., *Tillett v. J. I. Case Co.*, 756 F.2d 591 (7th Cir. 1985). Thus, recognition of the defense as a matter of federal law would not disturb any body of substantive state law to the contrary. Indeed, as we discuss below, the military contractor defense parallels several traditional doctrines of state common law. See generally Note, *Tort Remedies for Servicemen Injured by Military Equipment: A Case for Federal Common Law*, 55 N.Y.U. L. Rev. 601 (1980).

**2. The Military Contractor Defense Is A
Corollary Of The Federal Constitution,
Is Fundamentally Fair, And
Serves Important Public Interests**

At the time this Court first began to address the relationship of the soldier to state tort law in *Brooks v. United*

States, 337 U.S. 49 (1949), and *Feres v. United States*, 340 U.S. 135 (1950), it is doubtful that an action such as this one would even have been instituted. Concepts of privity barred most product design cases except those brought by the purchaser. Strict liability except for defective food products was virtually unheard of at that time.

The legal environment began to change in the 1950’s and 1960’s with the promulgation of the Uniform Commercial Code and its broadened concepts of liability for breach of warranty. It changed even more in 1964 when the American Law Institute adopted § 402A of the Restatement of Torts, Second, imposing strict liability on the seller of any product, not just food products, which caused harm to the user or consumer.

In one of the first cases to apply § 402A, *Putman v. Erie City Manufacturing Company*, 338 F.2d 911, 919 (5th Cir. 1964), the court quoted Professor Prosser’s explanation of the effect of § 402A:

“ . . . With the exception of the change in the law with respect to prenatal injuries, this is the most radical and spectacular development in tort law during this century.”

As these changes were occurring, courts began to confront damage suits arising from the use of products procured by the armed forces. Evolving in tandem with developing theories of liability are various defenses, including the military contractor defense.

Every state or federal court that has addressed the military contractor defense has recognized the validity of the defense. See, e.g., *Brown v. Caterpillar Tractor Co.*, 696 F.2d 246 (3d Cir. 1982); *In re “Agent Orange” Product Liability Litigation*, Nos. 85-6163, 85-6269, 85-6337, slip op. 5 (2d Cir., April 21, 1987); *Dowd v. Textron, Inc.*, 792 F.2d 409 (4th Cir. 1986), petition for cert. filed, 55 U.S.L.W. 3302 (U.S. Sept. 6, 1986) (No. 86-379); *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986), petition for cert. filed, 55 U.S.L.W. 3416 (U.S. Oct. 23, 1986) (No. 86-674); *Bynum v. FMC Corp.*, 770 F.2d 556 (5th

Cir. 1985); *Tillett v. J. I. Case Co.*, 756 F.2d 591 (7th Cir. 1985); *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984); *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985), *petition for cert. filed*, 55 U.S.L.W. 3074 (U.S. March 17, 1986) (No. 85-1529); *Sanner v. Ford Motor Co.*, 364 A.2d 43 (N.J. Super. Ct. 1976). Various rationales independently justify the defense. In combination, these rationales provide overwhelming support for the doctrine.

Separation Of Powers. The separation of powers doctrine supports recognition of the military contractor defense because the defense prevents civil courts from becoming entangled with the branches of the national government responsible for the conduct of the nation's military affairs.

The text of the Constitution expressly grants primary authority over the military to the executive and legislative branches. The power over military affairs is vested by the Constitution in Congress and the President. Article I, section 8 specifically gives Congress the power to "declare war, . . . raise and support armies . . . [and] provide and maintain a navy[.]" The President's power over the military as "commander in chief" is granted by Article II, section 2. "Judges possess no[ne of these] power[s]." *Tozer*, above, 792 F.2d at 405.

The proper design of military equipment is a non-justiciable issue. In numerous decisions, this Court has emphasized that courts should scrupulously avoid second-guessing military decisions.

In *Gilligan v. Morgan*, 413 U.S. 1 (1973), this Court held that the training and equipping of the military are matters committed by the Constitution to the legislative and executive branches and are not proper judicial concerns. In that case, following the fatal shooting of student protestors at Kent State University by Ohio National Guardsmen, certain university students sought continuing judicial surveillance over the training, weaponry and standing orders of the Ohio National

Guard. In holding the controversy to be non-justiciable, this Court said:

The relief sought by respondents, requiring initial judicial review and continuing surveillance by a federal court over the training, weaponry and orders of the Guard, would . . . embrace critical areas of responsibility vested by the Constitution in the Legislative and Executive Branches of the Government.

* * *

It would be difficult to think of a clearer example of the type of governmental action that was intended by the Constitution to be left to the political branches directly responsible—as the Judicial Branch is not—to the electoral process.

Id. at 7, 10.

In *Orloff v. Willoughby*, 345 U.S. 83, 93-94 (1953), this Court also emphasized that it is the responsibility of Congress and the President and not the courts to "run . . . the Army":

. . . [J]udges are not given the task of running the Army. The responsibility for setting up channels through which . . . grievances can be considered and fairly settled rests upon the Congress and upon the President of the United States and his subordinates. The military constitutes a specialized community governed by a separate discipline from that of the civilian. Orderly government requires that the judiciary be as scrupulous not to interfere with legitimate Army matters as the Army must be scrupulous not to intervene in judicial matters.

There also is a marked "lack of judicially discoverable and manageable standards for resolving" cases in which professional military judgments are at issue. *Baker v. Carr*, 369 U.S. 186, 217 (1962). In *Gilligan v. Morgan*, above, this Court recognized the limitations on the expertise of courts in military matters:

. . . [I]t is difficult to conceive of an area of governmental activity in which the courts have less competence. The complex, subtle, and professional de-

cisions as to the composition, training, *equipping* [emphasis added], and control of a military force are essentially professional military judgments, subject *always* to civilian control of the Legislative and Executive Branches.

413 U.S. at 10 (second emphasis in original). See also *Chappell v. Wallace*, 462 U.S. 296, 302 (1983).

Recently, the Court relied on this constitutional defense to bar a tort suit by the mother of a deceased serviceman who claimed that the Army had negligently exposed her son to danger. In *United States v. Shearer*, 473 U.S. 52, 58-59 (1985), the Court refused to "involve the judiciary in sensitive military affairs" or to require military officials "to stand prepared to convince a civilian court of the wisdom of a wide range of military and disciplinary decisions."

The selection and design of military equipment, especially in this era of highly technological warfare, are crucial military judgments. While the military departments frequently rely to some degree, as the Navy did in this case, on a military contractor to assist in the development and design of a military product, it is the military that exercises the ultimate judgment about what kind of materiel and weapons systems will best serve the national defense. Taking into account the special demands placed on personnel and equipment in times of war, the military must decide how to balance the cost, combat effectiveness and safety of the equipment.

Subjecting military design decisions to scrutiny by civil courts and juries would usurp these judgments. Among its various legitimate functions, tort law establishes standards for "acceptable" product design and performance. The premise of the civil jury system is that private citizens can bring their common experience to bear in deciding what decisions and standards are reasonable. That premise is sound when juries sit in judgment on consumer products designed for civilian use. It is decidedly unsound, however, when a jury is asked

whether a weapons system procured by the Navy was "safe enough." As the Fifth Circuit recognized in *Bynum*, above:

There can be no question that the design of military equipment is, at bottom, a military decision. Often dangerous designs must be used in the military context to meet the exigencies of our national defense, and even military equipment that is relatively safe for every day use may have to be operated on occasion under dangerous conditions or in a manner creating a high risk of harm.

770 F.2d at 569.

Only the military has the experience and, indeed, the responsibility to decide, for example, whether requirements of speed and maneuverability of military aircraft outweigh the safety that heavy armor plate might provide against gunfire or in crash landing. Only the military is in position to judge whether additional all-weather navigation systems, with their extra margin of safety, should be sacrificed for additional bomb load on an Air Force bomber. Only the military is in position to decide whether, for both operational purposes and most rescues, all military helicopters should have escape systems that jettison their escape hatches outward rather than to design the cockpit to remove the hatch inward.

Private tort litigation involving military contractors arising from allegedly "dangerous" military products would create product design standards that diverge from the military's own design judgments. Because civil judges and juries lack both the practical competence and the responsibility to superintend decisions about the design of military equipment, civil litigation involving the safety of military equipment would erode national security. That type of judicial intrusion upon military decision-making is precisely what this Court has repeatedly condemned as frustrating the Constitution's separation of powers.

Despite the assertion to the contrary, this Court has not indicated that it is willing to permit this kind of inquiry when a civilian government employee claims to have been injured as

a result of the crash of an allegedly defective military aircraft. In *Lockheed Aircraft Corp. v. United States*, 460 U.S. 190 (1983), the issue was whether the defendant military contractor's impleader of the government should have been dismissed in such a case. This Court only decided that a claim for indemnity is not barred by statute; it did not consider the standards that govern the military contractor's direct liability, if any, to the civilian government employee.

Feres/Stencel. Subjecting military contractors to liability for injuries arising from alleged design defects also would subvert the *Feres/Stencel* doctrine by allowing military personnel to recover indirectly what they are barred from recovering directly.

In *Feres v. United States*, above, the Court ruled that the United States cannot be held liable under the Federal Tort Claims Act to a member of the military injured while on active duty. In *Stencel Aero Engineering Corp. v. United States*, above, the Court extended that principle and ruled that, even if a serviceman might have a claim against a third party for injuries sustained, *Feres* precludes the third party from bringing an indemnity action based on the government's role in the wrongful conduct.

The reasoning of these decisions supports barring recovery against a military contractor who supplied products conforming to government specifications. In *Stencel*, the Court explained why an indemnity suit is barred:

'To permit [petitioner] to proceed . . . here would be to judicially admit at the back door that which has been legislatively turned away at the front door. We do not believe the [Federal Tort Claims] Act permits such a result.'

431 U.S. at 673, quoting *Laird v. Nelms*, 406 U.S. 797, 802 (1972).

By the same token, to permit servicemen to recover damages from military contractors for alleged defects in military equipment that the government commissioned but for which it is immune from suit also would "admit at the back

door" what Congress has "turned away at the front door." If military contractors were subject to suit for alleged defects in equipment built in conformity with military specifications, contractors would be required to pass this cost of doing business on to their customer, the United States, through higher prices for military equipment. The foreseeable effect on the federal treasury would be no less real and immediate than a suit directly against the government.

There is no basis for Petitioner's inference that in *Stencel* the Court "impliedly" rejected the military contractor defense. Although the Court refused to allow a military contractor to seek indemnity from the government for any liability to an injured serviceman, the case came before the Court at the pleading stage, before the lower courts had even considered whether the contractor itself could be held liable. Indeed, the court of appeals had expressly acknowledged that the contractor had invoked the military contractor defense, but stated that "[t]his question is not before us." *Donham v. United States*, 536 F.2d 765, 768 n.2 (8th Cir. 1976). Thus, in reviewing that decision, this Court had no reason to consider the validity or scope of the military contractor defense. See *Stencel*, above, 431 U.S. at 669 n.4.

The Court also has justified the *Feres/Stencel* doctrine as necessary to avoid judicial intrusion into the system of military discipline. See *United States v. Shearer*, above, 473 U.S. at 57-59. That rationale also supports recognition of the military contractor defense. In barring indemnity actions in *Stencel*, the Court reasoned:

. . . [I]t seems quite clear that where the case concerns an injury sustained by a soldier while on duty, the effect of the action upon military discipline is identical whether the suit is brought by the soldier directly or by a third party. The litigation would take virtually the identical form in either case, and at issue would be the degree of fault, if any, on the part of the Government's agents and the effect upon the serviceman's safety. The trial would, in either case, involve second-guessing military orders, and would often require members of the Armed Services

to testify in court as to each other's decisions and actions.

431 U.S. at 673.

Similarly, a suit against a contractor challenging product design decisions established or approved by the military departments would involve "second-guessing military orders." As a practical matter, a civil jury is incapable of making an informed decision about whether the military contractor is responsible for an "unreasonably" dangerous or defectively designed product, unless the jury can assess the military's own role in formulating the goals for the equipment and in supervising their achievement. See *Tozer v. LTV Corp.*, above, 792 F.2d at 406 ("it is nearly impossible to contend that the contractor defectively designed a piece of equipment without actively criticizing a military decision"); *Bynum v. FMC Corp.*, above, 770 F.2d at 565 ("[l]itigation involving defective designs in military products would take the identical form regardless of whether the named defendant happens to be the government or the military contractor").

This Court's May 18, 1987, decision in *United States v. Johnson*, No. 85-2039, once again has affirmed the *Feres* rule, even though that case did not involve the second-guessing of military decisions. The dissenters in *Johnson* would limit the *Feres* rule to second-guessing of military decisions; that, though, is precisely the case here.

Hazards of the Profession. Military personnel, by assuming a role in national defense, subject themselves to unusual hazards which no ordinary citizen confronts. The Ninth Circuit realistically recognized:

Members of the armed forces are not ordinary consumers with respect to military equipment. Their 'reasonable expectations of safety' are much lower than those of ordinary consumers. They recognize when they join the armed forces that they may be exposed to grave risks of danger, such as having to bail out of a disabled aircraft. This is part of the job. The Nation sometimes demands their

very lives. This is an immutable feature of their calling.

McKay v. Rockwell International Corp., above, 704 F.2d at 453. See also *Tozer v. LTV Corp.*, above, 792 F.2d at 407 ("Pilots of the Navy and Air Force, whose service and sacrifice make possible the security of this country, are not the military doubles of civilian motorists. Their lives are led in the company of peril.") It is fundamentally unfair to impose greater responsibility on military contractors for protecting the safety of men and women who pursue an inherently dangerous profession than the government itself assumes when it approves the design of the equipment and orders the military personnel to use it.

This additional basis for the military contractor defense is consistent with the general principle of common law that public servants and others who encounter hazards as part of their job are barred from seeking recovery for injuries sustained in performing their duty. For example, in virtually every jurisdiction in this country firemen, policemen and others engaged in emergency rescue work may not recover damages for injuries sustained on the job. The California Supreme Court explained in *Walters v. Sloan*, 20 Cal.3d 199, 142 Cal. Rptr. 152, 155 (1977), that the "fireman's rule"

is based on a principle as fundamental to our law today as it was centuries ago. The principle is . . . applicable to our entire system of justice—one who has knowingly and voluntarily confronted a hazard cannot recover for injuries sustained thereby.⁷

Relying on the same principle, state courts have denied recovery to other types of professionals whose occupations

⁷ See also *Phillips v. Hallmark Cards, Inc.*, 722 S.W.2d 86 (Mo. 1987); *Pottebaum v. Hinds*, 347 N.W.2d 642, 645 (Iowa 1984); *Krauth v. Geller*, 31 N.J. 270, 157 A.2d 129, 130-31 (1960); *Flowers v. Sting Security*, 488 A.2d 523, 535 (Md. Ct. Spec. App. 1985), petition for cert. granted, 494 A.2d 211 (Md. 1987) (fireman assumes "all normal risks inherent in [his] employment").

entail exposure to special hazards.⁸

The role of a Marine pilot—fortunately for our country—is to push to the limits. His mission, foreseeably, subjects him to danger. The military provides him with technology drawn from the private sector that may be at the cutting edge of technology. It would be fundamentally inconsistent with that relationship to allow him to invoke the law of torts to challenge the military equipment that he is assigned to use in his mission.

Fairness. The military contractor defense is also based in part on the fundamental principle that it would be unfair to impose liability on a person who faithfully executes a project directed and approved by the government. This Court relied on this principle in *Yearsley v. W. A. Ross Construction Co.*, 309 U.S. 18 (1940), where the Court stated that “it is clear that if . . . [the] authority to carry out the project was validly conferred, . . . there is no liability on the part of the contractor for executing [the government’s] will.” See also *In re “Agent Orange” Product Liability Litigation*, 506 F. Supp. at 762, 793 (E.D.N.Y. 1980), *rev’d on other grounds*, 635 F.2d 987 (2d Cir. 1980) (“tort liability principles properly seek to impose liability on the wrong-doer whose act or omission caused the injury, not on the otherwise innocent contractor whose only role in causing the injury was the proper performance of a plan supplied by the government”).

This principle of fairness is not confined to the government contracting context but applies in all cases where a contractor is contractually bound to carry out a specific plan provided by the person who retains him, whether or not that employer is a government entity. The *Restatement (Second) of Torts* states that where a contractor carries out a project in accordance with plans and specifications given to him, “the

⁸ See, e.g., *Hammond v. City of El Dorado Springs*, 242 S.W.2d 479 (Mo. 1951) (contractor hired to repair structural defects in water tank barred from recovering damages for injuries sustained in performing repair); *Nelson v. Hall*, 165 Cal. App.3d 709, 211 Cal. Rptr. 668 (1985) (veterinary assistant is barred from recovering damages for injuries resulting from attack by dog).

contractor is not required to sit in judgment on the plans and specifications” and “is not subject to liability if the specified design or material turns out to be insufficient to make the chattel safe for use, unless it is so obviously bad that a competent contractor would realize that there was a grave chance that his product would be dangerously unsafe.” *Id.* at § 404, Comment a (1965). State courts routinely apply this principle to deny recovery against independent contractors who carry out projects in accordance with their employers’ specifications. See, e.g., *Cooper v. Garmon Bros. Contractors, Inc.*, 166 Ga. App. 839, 305 S.E.2d 499, 500 (1983); *Hunt v. Blasius*, 74 Ill.2d 203, 384 N.E.2d 368, 371 (1979).

Consistent with this settled common law doctrine, the lower courts have recognized that these “considerations of fairness” are a central underpinning for the military contractor defense. See, e.g., *Tillett v. J. I. Case Co.*, above, 756 F.2d at 597 (“Many cases exploring the government contract defense have employed a fairness rationale in considering whether a government contractor who complies with government specifications should share in the Government’s *Feres* and *Stencel* immunity.”) See also *In re “Agent Orange” Product Liability Litigation*, Nos. 85-6163, 85-6269, 85-6337, slip op. (2d Cir., April 21, 1987).

Moreover, the military contractor is not only bound to produce and deliver a product in accordance with specifications established or approved by the government, the military contractor also necessarily cedes to the government, which is immune from liability, control over any remedial steps. Unlike the manufacturer of a consumer product, a military contractor has no power to modify the design of the military product unilaterally, nor does the military contractor have the power to recall the product or remove it from the shelves. Thus these techniques for avoiding tort liability are foreclosed to the military contractor.

While this rule bars private damage recoveries against military contractors, there is no particular unfairness to military personnel. As the Court explained in *Stencel*, Con-

gress has established, as a substitute for tort liability, "a statutory 'no fault' compensation scheme which provides generous pensions to injured servicemen. . . ." 431 U.S. at 671. See 10 U.S.C. §§ 1071-87 (program of medical care for members of uniformed services and dependents); 38 U.S.C. §§ 310-15 (schedule of compensation to veterans and dependents for wartime disabilities); 38 U.S.C. §§ 321-22 (schedule of compensation to survivors of veterans for wartime deaths); 38 U.S.C. §§ 331-35 (schedule of compensation for peacetime disabilities); 38 U.S.C. §§ 341-342 (schedule of compensation for peacetime deaths).

Indeed, denying recovery to a serviceman injured as a result of a design defect, rather than by the negligence of a superior officer, for example, results in equal treatment of all military personnel. A serviceman may not sue anyone when wrongful conduct of military superiors or colleagues injures him. *Feres v. United States*, above; *United States v. Shearer*, above. There is no discernible reason to permit recovery simply because the injury results from use of a product procured by his military superiors.

Impact On Military Procurement Policy And Defense. Finally, it is plainly in the public interest to have the manufacturing industries of the nation ready, willing and able to support the national defense effort both in peacetime and in wartime. A manufacturer must know that it will be treated fairly in order for it to offer the cooperation and support so necessary to the national defense. The manufacturers obviously have a reduced incentive to bid upon or perform government contracts, if they may be held liable for design conditions in plans and specifications from which they cannot deviate. Thus, a defense manufacturer who faithfully follows the directions of the United States promotes the national defense by encouraging industry to participate in developing the advanced technologies on which our military security depends.

B.THE MILITARY CONTRACTOR DEFENSE APPLIES WHENEVER THE GOVERNMENT ESTABLISHES OR APPROVES REASONABLY PRECISE SPECIFICATIONS AND THE CONTRACTOR DID NOT ACTUALLY KNOW ABOUT AN ALLEGED DEFECT OF WHICH THE GOVERNMENT WAS UNAWARE

The Second, Third, Fourth, Fifth, Seventh and Ninth Circuits have adopted an essentially uniform standard for application of the military contractor defense, based largely on the decision in *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984). See *In re "Agent Orange" Product Liability Litigation*, Nos. 85-6163, 85-6269, 85-6337 (2d Cir., April 21, 1987); *Dowd v. Textron, Inc.*, 792 F.2d 409 (4th Cir. 1986); *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986), and this case below, 792 F.2d 413 (1986); *Brown v. Caterpillar Tractor Co.*, 696 F.2d 246 (3d Cir. 1982); *Bynum v. FMC Corp.*, 770 F.2d 556 (5th Cir. 1985); and *Tillett v. J. I. Case Co.*, 756 F.2d 591 (7th Cir. 1985).

In light of the principles supporting the military contractor defense, the defense should apply whenever the contractor can demonstrate that (1) the government established or approved reasonably precise specifications for the equipment, (2) the contractor manufactured the equipment in conformity with the specifications, and (3) the contractor warned the government about any dangerous defects in the design of the product actually known to the contractor but not to the government.

The defense recognizes that it is ultimately the military departments, both as a matter of constitutional principle and procurement practice, that determine what materiel to purchase for the armed forces. This formulation also reflects the practical reality that the military departments maintain huge staffs of civilian and military experts who actively participate in defining the goals and details of military procurements. These government personnel—some of whom may actually be called upon to use the products that they help design—have

both the personal motive and the technical expertise to participate meaningfully in a process that makes such procurement ultimately the government's own choice.

Some courts also have mentioned a separate element to the defense: that the government itself is immune from liability for the choices made. Analytically, however, there is no reason to treat the government's immunity as a prerequisite, since common law doctrine excuses the agent from liability for carrying out construction in accordance with specifications, even if the person who retains the contractor and approves the design may bear liability.

As a practical matter, however, the question whether or not the government is immune is academic. Under the *Feres* doctrine, as amplified in *Stencel* and *Shearer*, an active-duty serviceman may not sue the government or military superiors for culpability in approving a defective design for a military product. Even a civilian employee of the government is precluded from bringing a tort action against the government in such a setting. See *Lockheed Aircraft Corp. v. United States*, above, 460 U.S. at 191.

Moreover, regardless of the status of the plaintiff or the nature of the product, the "discretionary function" exception to the government's limited waiver of sovereign immunity under the Federal Tort Claims Act almost certainly would foreclose any claim against the government alleging liability for issuing or approving a "defective" design. See, e.g., *United States v. Varig Airlines*, 467 U.S. 797, 808-11, 819-20 (1984); *Allen v. United States*, No. 84-2126 (10th Cir., April 20, 1987). In *Dalehite v. United States*, 346 U.S. 15, 35-36 (1953), for example, the Court ruled that the "discretionary function" exception includes determinations made "in establishing plans, specifications or schedules of operations," including specifically a decision to stockpile dangerous chemicals originally manufactured to military specifications for explosives but also useful as agricultural fertilizer. (Emphasis added). Therefore, it would be a pointless distraction to inject the issue of the government's immunity in a design liability

case when a plaintiff is suing a military contractor, not the government.

Only the Eleventh Circuit in *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736, 746 (11th Cir. 1985), petition for cert. filed, 55 U.S.L.W. 3074 (U.S. March 17, 1986) (No. 85-1529), adopted a formulation of the military contractor defense significantly different from the one we urge the Court to approve. In *Shaw*, the court concluded that a contractor would be liable for design defects unless it demonstrated that: (1) it did not participate, or participated only minimally, in the design of the defective product; or (2) it warned the government of any risks in the design—even if it did not actually know of the alleged defect—and notified the government of alternative designs reasonably known to the contractor, and that the military nonetheless authorized the contractor to proceed with the dangerous design. The *amici* supporting the Petitioner would go even further. They urge that a manufacturer should be *presumed* to know of defects, whether it actually does or not. The *Shaw* test is not feasible and is inconsistent with the principles that underlie the defense.

The majority formulation, unlike the *Shaw* test, is consistent with the realities of the military procurement process. There is simply no comparison between the military and the uninformed civilian consumer. Military equipment is frequently very complex and at the frontiers of technological feasibility. Established military contractors have enormous experience and skill in helping to meet military equipment needs. The contractors in turn work with military teams who also have considerable expertise in both the operational objectives for the products and their proper design. As explained in extensive detail in the *amici curiae* brief of the National Security Industrial Association, and others, military equipment is typically designed through a complex back-and-forth process between the government and the contractor, in which both parties have expertise. We respectfully refer the Court to that brief for a description of the realities of the procurement process, a process which regularly and predictably involves lengthy consultation, cooperation and revision

before the government makes the final determination of the design of a military product.

Under the *Shaw* test, military contractors would have an undesirable incentive to avoid cooperating with the government in designing equipment. Anything other than minimal involvement in developing the design of the equipment would expose them to possible liability. As a result, the quality of military equipment would suffer, and national security would be impaired.

The generally recognized formulation of the defense, by contrast, would encourage military contractors to lend their expertise to the process. So long as the government actually retains ultimate decision-making power over the final specifications, contractors would not expose themselves to possible liability. As virtually all of the courts that have addressed the contours of the defense have perceived, the quality of military equipment would be maintained and national security enhanced.

There is only superficial appeal to Petitioner's argument that the *Shaw* test would improve safety by encouraging contractors to scrutinize designs for potential hazards. Even if military contractors would be willing to agree to more than "minimal involvement" in the design process, the second branch of the *Shaw* test would create an undesirable and wasteful incentive for military contractors to provide warnings about every conceivable aspect of thousands of design decisions and to seek "clear" approvals of any element of the design that might carry even the most remote risk of injury.

Moreover, the legitimate concern about safety does not require imposing liability for defects that a contractor "should have" discovered but did not. Military contractors typically have a long-standing relationship with the government, and they therefore have a powerful incentive to supply products that are as safe as operational needs permit. Moreover, unlike private consumers, military procurement officials have expertise that gives them special capacity to identify avoidable safety issues during the design process and authority to direct

necessary changes in design. It would not serve the procurement process or identify substantial but avoidable risks to adopt a rule of liability that would induce contractors to compile massive tomes indulging in "what if" speculation addressing every design feature, part or alternative in a complex weapons system. Yet that is the kind of exercise the *Shaw* test would mandate.

The concerns that support the military contractor defense apply regardless of the exact extent of the contractor's involvement in the design process. Whether a specific design proposal originated with the military or with the contractor, the military department remains the ultimate decision-making authority with respect to the process of designing and testing the equipment. The *Shaw* approach would inevitably invite disruptive and contentious finger-pointing as military procurement officials and defense contractors argue about who was "more responsible" for originating a particular design concept.

Thus, in contrast to the straight-forward and easily applied standards adopted by the other circuits, the *Shaw* inquiry would embroil judges and juries in the unseemly business of assessing the relative culpability of military superiors who approved the purchase of the product that the serviceman was assigned to use. Accordingly, regardless of the extent to which the contractor may have contributed to the design process, civil litigation challenging an alleged design defect in military products would require "second-guessing" military decisions that are ultimately within the province of Congress and the Commander-in-Chief.

Furthermore, the *Shaw* test would give lay juries free rein to make crucial decisions about the proper level of safety for military equipment, even though those decisions would diverge from the standards applied by the military departments themselves. Under the *Shaw* test, the jury would decide not only whether the contractor "should have known" that the product was defective, but they also would be expected to decide whether the military department would have selected a

different design, if it had been aware of the alleged defect. *See* 778 F.2d at 745 ("the design *a priori* is unlikely to meet the military's general qualitative specifications: that is, it has not in fact accomplished its mission, or performed properly, simply, or safely"). This additional inquiry would be essential to showing causation.

There is no reason to assume, however, that alternatives that might appear appropriate to a lay jury applying the expectations of ordinary consumers would actually be selected by the military as suitable for the conduct of war. If anything, the assumption should be to the contrary. In fact, the case law is replete with instances in which the military, in furtherance of its goals, has determined to utilize military equipment despite information—from the contractors or other sources—that the equipment was dangerous. *See, e.g., In re Air Crash Disaster at Mannheim*, 769 F.2d 115, 124 (3d Cir. 1985), *cert. denied sub nom., Schoenborn v. Boeing Co.*, 106 S. Ct. 851 (1986); *Tillett v. J. I. Case Co.*, above, 756 F.2d at 599 n.5; *Dowd v. Textron*, above, 792 F.2d at 411 (Army decided to reject modifications proposed by contractor because Army concluded that proposed modifications would be "ineffective or too costly, or would have interfered with the military mission of the helicopter by impairing performance because of additional weight that the modifications might add").

No reasonable formulation of the military contractor defense can subject contractors to liability for allegedly "unsafe" designs that the military itself determined—or would have determined—to be acceptable, or perhaps even necessary, to achieve the product's mission. Thus, the *Shaw* test would create havoc by requiring civilian courts and juries to decide not only whether a contractor "should have" discovered what they view as a "defect" in the design of the military procurement, but also whether the military "would have" decided to make potentially complicated, expensive, and obstructive changes necessary to accommodate altering the "defect."

The *Shaw* test improperly assumes that whenever the government relies in part on the contributions of a contractor it abdicates its decision-making responsibility to the contractor. As this case illustrates, however, the military departments assiduously preserve their ultimate authority to determine the specifications for virtually any military procurement, even when the prospective contractors have participated in the design process. The more reasonable presumption, therefore, is that the government actually and meaningfully exercises the authority that it has retained to approve the final design of military equipment. The presumption that the design judgments are ultimately military judgments should be rebuttable only where the evidence shows that the product contained a defect that was *actually* known to the contractor but not to the government.

Furthermore, the *Shaw* formulation actually would be more disruptive to the military command structure than the proposed test. Under *Shaw*, the focus of the litigation would be identifying the representatives of the military department who participated in making the challenged decision, and determining whether or not their judgments were adequately "informed." Thus, the litigation would have to focus on the relative degrees of knowledge and involvement of military officials and the contractor. It would probe the motives for the judgments made or not made by military officers. By contrast, litigation under the broader formulation dispenses with that line of inquiry. Instead, it focuses on what is ordinarily a straight-forward matter of documented fact: Did the government approve the specifications according to which the contractor manufactured the product, and did the contractor actually know of the alleged defect and fail to tell uninformed procurement officers about it?

As we have explained, military personnel accept the risks of military service as an inherent part of their occupation, rather than on a risk-by-risk basis or product-by-product basis. Thus, this rationale for the military contractor defense forecloses the view that the defense should not apply when a contractor had a significant role in designing a particular

product, or when neither the government nor the contractor perceived a latent hazard.

Finally, the *Shaw* standard also fails to accommodate the fairness considerations. At least so long as the contractor did not have actual knowledge of a defect unknown to the government, it would be unfair to subject the contractor to liability for building a product that conformed to government-approved specifications. Since the government retains authority and responsibility for the design decisions, the contractor's defense against liability should not turn on whether the contractor had only minimal involvement in the design process or volunteered substantial assistance.

The test suggested by amicus American Trial Lawyers Association is even more unrealistic. It should be viewed for what it is—a complete rejection of the military contractor defense. It is nothing more than a restatement of the doctrine of strict liability, § 402A, Restatement of Torts 2d.

C. THE COURT OF APPEALS PROPERLY APPLIED THE MILITARY CONTRACTOR DEFENSE IN THIS CASE

The court below correctly concluded that the military contractor defense precluded subjecting Sikorsky to liability for alleged defects in the design of the emergency escape system of the CH-53D helicopter. As the court of appeals ruled as a matter of law, the evidence in this case established each of the three basic elements of the defense.

1. The Government Approved Reasonably Precise Specifications For The CH-53D Helicopter

The Navy approved "reasonably detailed specifications" for the emergency escape system for the CH-53D helicopter. 792 F.2d at 414-15. Indeed, the design of the CH-53D helicopter, and of the emergency escape system in particular, reflected a careful and deliberate process initiated by the Navy and at all times controlled by the Navy.

As discussed in the Statement, the Navy unilaterally issued the "Type Specification" for the CH-53A in 1962

before it had even selected a contractor. After the Navy selected Sikorsky to build the helicopter, the Navy issued the "Detailed Specification" for the helicopter. As the court of appeals accurately stated, the Detailed Specification was produced through extensive "back-and-forth" discussions between the Navy and Sikorsky. 792 F.2d at 414; *see also* J.A. 292-93.

Together, the Type Specification and Detailed Specification established virtually every design parameter for the new helicopter, including its emergency escape system. For example, the Detailed Specification contained a specific direction concerning the very feature of the escape system that Petitioner claims was improperly designed:

Emergency escape shall be provided for pilot and copilot through cockpit side windows *which shall be readily jettisonable*. Both internal and external handles shall be provided to actuate the release mechanism. The handles of the release mechanism shall be so located, shaped, and provided with detents as to prevent inadvertent actuation. (J.A. 542) (*emphasis added*).

In addition, the Type and Detailed Specifications incorporated the Navy's "General Specification for Design and Construction of Aircraft Weapon Systems, Vol. II—Rotary Wing Aircraft" (J.A. 514), which governed the design of all Navy helicopters. That General Specification provided that:

Manual escape exits shall be provided as necessary to permit ready and safe egress of rotary wing aircraft occupants in an emergency. All hatches, doors, windows, or ports, which are to be used as emergency escape exits, shall be quick opening, easily operable, *and shall be jettisonable* when in a fully closed position, a fully opened position, and in any intermediate position. (J.A. 522) (*emphasis added*).

After the Navy and Sikorsky entered into the contract for the CH-53A in 1963, the Navy and Sikorsky worked together to test, and if necessary, refine the design of the helicopter. As required by the contract, Sikorsky completed a mock-up of

the helicopter cockpit, including all the controls and the emergency escape system. In accordance with its usual practice, the Navy inspected the mock-up to determine whether it conformed in all respects to the specifications and to determine whether any design changes were necessary. After directing minor modifications, the Navy approved the mock-up (J.A. 301). Sikorsky then produced the two prototype helicopters for inspection by the Navy. The elaborate structural tests and demonstrations to be performed by the Navy were set forth in "Demonstration Requirements for CH-53A Helicopters" (J.A. 550). The Demonstration Requirements provided that:

The contractor shall have demonstrated by tests that the escape system provided for the helicopter is adequate for personal safety.

In addition, section 3.17.9 of the Demonstration Requirements, captioned "Escape Hatches," provided:

A ground demonstration shall be made to show the ease with which escape hatches may be opened and to show the accessibility and adequacy of the opening to escaping personnel wearing apparel for use in the helicopter in service.

Apart from these specific requirements, the Demonstration Requirements authorized the Navy's contracting officer to require any demonstrations and trials not specifically called for in the contract which he believed to be necessary to demonstrate that the helicopter was acceptable to the Navy.

The Navy conducted the required demonstrations at the Naval Air Test Center at Patuxent River, Maryland (J.A. 405-406). The Navy approved the two prototype aircraft and then exercised its option to purchase the full complement of 124 CH-53A helicopters provided for in the contract (DX-12).

Relying extensively on the design testing for the CH-53A, the Navy developed the detailed specifications for the CH-53D model of the helicopter. See "Detailed Specification for Model CH-53D Helicopter Fiscal Year 1969" (J.A. 540). The design specifications for the emergency escape hatch

system of the CH-53D were in all relevant aspects the same as those for the CH-53A.

Thus, the brightly marked trail of documentary evidence showed unmistakably that the Navy wanted a helicopter with an escape hatch that would be jettisonable overboard, that it actually observed how escape would occur with this design, and that Navy personnel expressly and repeatedly confirmed that aspect of the CH-53. At trial, the Petitioner presented no evidence to rebut the proof that the Navy had approved "reasonably precise" specifications for the escape system of the CH-53D helicopter.

Petitioner now contends (Petitioner's brief at 41), however, that the Court should ignore the government's approval of the design in light of the "Design Responsibility" clause which appears in the contracts for the CH-53. That clause provides:

In releasing design data or drawings or in releasing aircraft for flight, the Government accepts no responsibility for the successful operation of the equipment manufactured by the contractor (J.A. 495, 498).

This clause does not support the weight that Petitioner now seeks to place on it.

Both the language of the clause and its origin show that it is irrelevant to a tort claim by a third party against a military contractor. The sole purpose of this type of clause is to attempt to allocate *contractual* responsibility between the contractor and the Navy in the event the product fails to perform in accordance with the contract and the specifications. Its purpose is to free the government from an argument that government reviews and approvals during development and testing of the equipment establish, prematurely, that the government has "accepted" the equipment, including the design. Under government contracting principles "acceptance" is generally conclusive on the government, except for remedies and warranties that are expressly reserved (such as under the standard "Correction of Defects" clause discussed

below). *E.g.*, *C. H. McQuagge v. United States*, 197 F. Supp. 460 (W.D. La. 1961); *T. M. Industries*, ASBCA No. 19068, 75-1 BCA ¶ 11,056. The design responsibility clause included no remedy which survived acceptance.

Moreover, even in the context of litigation between the government and its contractors, clauses of this type are not favored and are not enforced where the government has mandated a particular design. *See United States v. Spearin*, 248 U.S. 132, 137 (1918); *Toombs & Co. v. United States*, 4 Cl. Ct. 535, 547 (1984), *aff'd*, 770 F.2d 183 (Fed. Cir. 1985); *Radionics Inc.*, ASBCA No. 22727, 81-1 BCA ¶ 15,011, at 74,778 (1981). In addition, the government has been held contractually responsible to the contractor, despite this type of disclaimer, when the contractor produced the design but the government commented on it and approved it. *E.g.*, *Tranco Industries, Inc.*, ASBCA 22379, 78-2 BCA ¶ 13,307 at p. 65, 082-83; *Temco Aircraft Corp.*, ASBCA No. 6541, 61-2 BCA ¶ 3211; *E. L. Cournand & Co.*, ASBCA No. 3008, 57-1 BCA ¶ 1177.⁹ Similarly, the government has been held responsible for the design when it "accepted" the product following testing and inspection. *E.g.*, *C. H. McQuagge v. United States* and *T. M. Industries*, above.

Thus, despite Petitioner's imaginative argument, the "Design Responsibility" clause does not purport to allocate tort liability to third parties. It certainly does not waive the generally recognized military contractor defense.

Finally, even if it had some relevance to this kind of litigation, the narrow "Design Responsibility" clause would not justify ignoring the Navy's substantial role in the design of the CH-53D helicopter. This was not a case in which the Navy merely performed a ministerial function "[i]n releasing design data or drawings" or simply participated by "releasing aircraft for flight." Rather, following typical defense procurement practice, the Navy specified its requirements for the

⁹ Since the Armed Services Board of Contract Appeals is expert in interpreting these and similar clauses, these decisions of the Board are entitled to substantial deference.

helicopter, worked with Sikorsky in developing the detailed design specification, reviewed the helicopter configuration while it was being developed, tested the prototype and finally promulgated Naval specifications for the helicopter and inspected and tested the finished products to make certain they met those specifications. This level of government involvement in the design process goes far beyond the level of involvement that has been held sufficient to justify ignoring disclaimers of the type on which Petitioner relies.¹⁰

2. Sikorsky Manufactured The Helicopter In Conformity With The Specifications Approved By The Navy

The second element of the military contractor defense also exists here because Sikorsky built the emergency escape hatch system in accordance with the Navy specifications. Furthermore, by accepting the finished helicopter the Navy manifested its judgment that the helicopter complied with the specifications.

We have explained above that both the General Specification and the Detailed Specification for this helicopter required that Sikorsky manufacture the hatch to be "jettisonable." This clearly meant that the helicopter had to be built with an escape system that allowed the escape hatch to be tossed overboard. There is no record evidence to the contrary. Indeed, an expert witness for Petitioner acknowledged on cross-examination that the term "jettison" means, in this context, to throw the hatch out (J.A. 240). As required by the specifications, Sikorsky manufactured the CH-53D helicopter so that its escape hatch could be tossed overboard, either by

¹⁰ The "Correction of Defects" clause in the 1968 contract, also pointed to by Petitioner, obligates Sikorsky after final acceptance. But this clause makes it clear that Sikorsky's remaining obligations were limited ("consist solely") to correction of "any defects in material or workmanship or any failure to conform to the requirements of the contract," provided that notice of such defects be provided "within six (6) months of delivery." This obligation lapsed over a decade before the accident. In any event, the clause would not have required or permitted Sikorsky to change the CH-53D design mandated by the Navy.

the pilots seeking to escape their aircraft or by rescue personnel trying to reach them from outside.

**3. Sikorsky Was Not Aware Of Any Defects In The
Emergency Escape Hatch Of Which The
Government Was Unaware**

Finally, the third element of the defense is satisfied because there is no evidence that Sikorsky was aware of any defect in the escape hatch system about which the government was not aware.

As a threshold matter, there simply was no evidence that would support the conclusion that the escape system was defective at all. If the design was not defective, then Sikorsky obviously was under no conceivable duty to warn the Navy of a defect. The decision to design the escape hatch so that it could be thrown overboard was entirely reasonable, especially given the variety of circumstances under which the pilot or copilot could be expected to make an emergency escape. In most, if not all, cases it would be easier to escape by discarding the hatch away from the aircraft, whereas removing the hatch into the crowded cockpit would generally imperil escape. The validity of this common-sense reasoning is confirmed by the United States Army Aircraft Crash Survival Guide, which states that "remov[ing] the exit closure inward would add to the congestion and impede escape." The Guide recommends that, unless an aircraft is pressurized—and the CH-53D helicopter is not—emergency side hatches should be designed to fall away from the aircraft.

Furthermore, even if there were any defect in the emergency escape system, the court of appeals aptly concluded after reviewing the evidence that there is "nothing in the record that indicates there were any hazards of which Sikorsky was aware and the Navy was not." 792 F.2d at 415. Both the outward-jettison feature and the location of the collective were as readily observable to the Navy as they were to Sikorsky. Indeed, when the Navy examined the mock-up and the two prototypes, the Navy had both the opportunity and the responsibility to evaluate the safety of the escape

hatch as well as the configuration of the controls in the cockpit. Furthermore, the Navy maintained a permanent staff of engineers at the Sikorsky plant in Connecticut to consult on the design, testing and production of the helicopter.

The potential hazards of escaping from a helicopter that crashes at sea would hardly be foreign to Navy procurement officers. After all, they were commissioning a helicopter for Navy and Marine pilots to use for amphibious assaults. It beggars the imagination to assume that Sikorsky knew something about the risks of operations at sea that the Navy itself did not recognize.

Under these circumstances, as the court of appeals concluded, there is no basis for Petitioner to contend that the government could have been unaware of the alleged defects that Petitioner alleges Sikorsky should have discovered. Thus, the trial court erred as a matter of law in allowing the claim of defective design to go to the jury when the evidence established that Sikorsky manufactured and delivered a helicopter that fully conformed with Navy-approved specifications and Sikorsky had no knowledge of any defect.

Petitioner finally argues that the element of the military contractor defense requiring the contractor to reveal hazards associated with its product to the United States is significantly different as between the *McKay* opinion and the *Agent Orange* opinion. The *McKay* court stated the element in the term subsequently adopted by the Fourth Circuit, that the supplier warn the United States of hazards of which it was aware but the United States was not. *McKay*, 704 F.2d at 451. The *Agent Orange* court required the contractor to ensure that the United States knows at least as much about the hazards as the contractor. *In re "Agent Orange" Product Liability Litigation*, 534 F. Supp. 1046, 1055 (E.D.N.Y. 1982).

Petitioner asserts the difference between the elements of *McKay* and *Agent Orange* as a basis both for his allegation of a divergence of law between the circuit courts and his allegation that the Fourth Circuit's reversal constituted an infringement of his right to a jury trial. Petitioner's brief,

however, analyzes the *Agent Orange* decision without adequately evaluating the actual charge to the jury in *Boyle*. With respect to the element of knowledge, the trial court instructed the jury:

That the United States Navy knew as much or more than the defendant about the helicopter's hazards and, therefore, defendant did not need to warn the Government of the dangers involved in the use of the equipment (J.A. 461).

There was no conflict between the trial court's charge and the formulation of the defense by the Fourth Circuit. The Fourth Circuit expressed this element as:

The supplier warned the United States about dangers in the use of the equipment that were known to the supplier but not to the United States.

792 F.2d at 414.

Both the Fourth Circuit and the trial court stated the standard in terms of knowledge possessed and a duty to warn; neither standard requires a warning where the Government was equally knowledgeable. There is no evidence that Sikorsky was aware of any hazards or dangers associated with the cockpit configuration or the copilot's emergency escape system which it failed to make known to the Navy. The Fourth Circuit's formulation of the knowledge standard and duty to warn was substantively indistinguishable from the jury instruction.

In fact, the evidence required to prove the element, whether under *McKay* or *Agent Orange*, is identical. Both formulations of the element require the contractor to make known to the United States knowledge of defects which it has that the government does not. When this knowledge is transferred, the United States then knows as much as the contractor about the hazard. Although they are stated differently, the *McKay* and *Agent Orange* elements require the same behavior on the part of the contractor.

The *McKay* test is easy to follow. Where it reasonably appears that a design decision by a military service will be

questioned in litigation, a judge need only look at *McKay*'s three elements. If they are all present, the defense applies, and the case must be dismissed. But if any one of the elements—government approval of the design, construction in accordance with the design, and warnings about known defects in the design—is missing, the defense does not apply. The court will deal with objective facts, not the subjective issues of imputed or presumed knowledge and relative degrees of participation in the plans and specifications.

D.THERE IS NO BASIS FOR REMANDING THIS CASE FOR A NEW TRIAL

Petitioner requests that the jury verdict in the trial court be reinstated or that, in the alternative, the case be remanded for trial on the military contractor defense with the defense formulated in a different way from the Fourth Circuit formulation. Sikorsky properly moved for a directed verdict whenever it could and properly objected to the court's charge to the jury. Rules 50, 51, Fed. R. Civ. Proc.

There is no basis for restoring the verdict. There is likewise no reason for a remand. The testimony and documents contained in the voluminous record of this case prove, without any conflict in the evidence, that Sikorsky established each element of the military contractor defense adopted by the Fourth Circuit. Without any conflict in the evidence there is nothing for a jury to resolve. Remand, therefore, would be a useless act.

IV

CONCLUSION

The decision of the court of appeals correctly applied the law to the facts of this case. It should be affirmed.

Respectfully submitted,

LEWIS T. BOOKER
(COUNSEL OF RECORD)
RICHARD H. BURTON
LONNIE D. NUNLEY, III
Hunton & Williams
707 East Main Street
P. O. Box 1535
Richmond, Virginia 23212
(804) 788-8200

Counsel for Respondent

Of Counsel:

PHILIP A. LACOVARA
MARK A. DOMBROFF
JOHN D. ECHEVERRIA
Hughes Hubbard & Reed
1201 Pennsylvania Avenue, N.W.
Washington, D.C. 20004
(202) 626-6200

W. STANFIELD JOHNSON
Crowell & Moring
1001 Pennsylvania Avenue, N.W.
Washington, D.C. 20004-2505
(202) 624-2500

APPENDIX 1

SUBSIDIARIES AND AFFILIATES OF UNITED TECHNOLOGIES CORPORATION

<u>Name</u>	<u>State or Country of Incorporation</u>
AAC-Westland Limited	United Kingdom
AMBAC S.p.A.	Italy
Ancensores Angulo S.A.	Spain
Ansensores y Montacargas Eguren S.A.	Peru
Armorlift S.A.R.L.	France
Ascendes S. A.	Luxembourg
Ascenseurs Clerebout S.A.	Belgium
Ascenseurs Gendre Otis S.A.	Switzerland
Ascenseurs J. Camus	France
Ascenseurs Menard S.A.	France
Ascenseurs W. Sangalli S.A.	France
Ascensores Otis de Venezuela C.A.	Peru
Ascinter-Otis S. A.	France
Bec Air S.A.	France
Caricor Ar Condicionado e Refrigeracao do Brasil Ltda.	Brazil
Carlo Eisner S.p.A.	Italy
Carrier Air Conditioning (Holdings) Limited	New South Wales

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<u>Name</u>	<u>State or Country of Incorporation</u>
Carrier Air Conditioning (New Guinea) Pty. Limited	New Guinea
Carrier Air Conditioning Egypt, Ltd.	Egypt
Carrier Aircon Limited	India
Carrier Experts Service (Central Maylasia) Sdn. Bhd.	Malaysia
Carrier Forsaljnigs Aktiebolag	Sweden
Carrier Higashi-Chugoku Co., Ltd.	Japan
Carrier International of Bahrain, E.C.	Bahrain
Carrier International Sdn. Berhad	Malaysia
Carrier Nishi Chugoku Co. Ltd.	Japan
Carrier Saudi Service Company	Saudi Arabia
Carrier Services Management Pty. Limited	New South Wales
Carrier Taiwan Co., Ltd.	Taiwan
Carrier-U.K. Distribution Limited	United Kingdom
Carter Wind Systems, Inc.	Texas
CEAM Lazio Sud	Italy
CEAM Servizi Adriatica	Italy
CEAM Servizi Firenze	Italy
CEAM Servizi Maremma	Italy

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CEAM Servizi Milano	Italy
CEAM Servizi Tirrenica	Italy
CEAM Servizi Torino	Italy
China Tianjin Otis Elevator Com- pany, Ltd.	China
Clymalynx A.G.	Lichtenstein
Companhia Eletromecanica	Brazil
COMPORTEL, S.A.R.L.	Portugal
Daewoo Carrier Corporation	Korea
Daewoo-Sikorsky Aerospace, Ltd.	Korea
Delchi Carrier S.p.A.	Italy
Diavia S.p.A.	Italy
Disolec S.A.R.L.	France
Dynamic Turbocharger Services Pty. Limited Ltd. (Queensland)	Australia
Dynamic Turbocharger Services Pty. Limited Ltd. (Victoria)	Australia
E. H. Industries Limited	United Kingdom
Eddy Current Testing (Pte.) Ltd.	Singapore
ELEMA S.A.	Spain
Elevadores Canarios S.A.	Spain

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Elevadores en Servicio, S.A. de C.V.	Mexico
Elizondo, S.A. de C.V.	Mexico
Entalpia S.A. de C.V.	Mexico
Entrol Systems Sdn. Berhad	Malaysia
Essener Aufzugsfabrik Bruno-Haack G.m.b.H.	West Germany
Essex Electricas Industriales, S.A. de C.V.	Mexico
European Aerospace Company, N.V.	Belgium
FES, Inc.	Pennsylvania
Flohr-Otis Aufzuege G.m.b.H.	West Germany
Freissler Otis G.m.b.H.	Austria
Frimar S.r.L.	Italy
Gate France S.A.	France
Gate S.p.A.	Italy
GEAT Gesellschaft fur Ange- wandte Technologie G.m.b.H.	West Germany
General Aircon Distribution, Ltd.	Japan
Gestem S. A.	Belgium
Grimm-Carrier Ltd.	Thailand

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Guide Rails Pty. Ltd.	Australia
Hamilton Standard Limited	United Kingdom
Hamilton Standard Stork B.V.	Netherlands
Hebo Fordertechnik G.m.b.H.	West Germany
Heli-Europe Industries Limited	United Kingdom
IAE International Aero Engines A.G.	Switzerland
Industrial Electrical Specialties, Inc.	Illinois
Insulation Systems and Machines Ltd.	United Kingdom
Insulation Systems Isola Ltd.	Switzerland
Internacional de Climatizacion S.A.	Spain
International Fuel Cells Corpora- tion	Maryland
Isola Essex AG	Switzerland
Isolants Nord Afrique S.A.	Algeria
Keihin Sobi Kabushiki-Kaisha	Japan
Lakshmanan Isola Ltd.	India
Link-Carlyle Ltd.	Thailand
Manufacturas Especializadas, S.A.	Mexico

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Mecanismos Auxiliares Industriales, S.A.	Spain
Microtecnica S.p.A.	Italy
Monitor SNC	France
Mostek France S.A.R.L.	France
National Trading Corporation S.A.L.	Lebanon
Nippon Otis Elevator Company	Japan
Normalair-Garrett (Holdings) Lim- ited	United Kingdom
Otis Elevator Company	Kuwait
Otis Elevator Company	India
Otis Elevator Company Limited	South Africa
Otis Elevator Company S.A.E.	Egypt
Otis Elevator Company S.A.L.	Lebanon
Otis Elevator Saudi Arabia Ltd.	Saudi Arabia
Otis Europe S.A.	France
Otis Maroc S.A.	Morocco
P&WC Aircraft Services (A'Asia) Pty. Ltd.	Australasia
Parker Electronics, Inc.	Delaware

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Pernas Otis Elevator Company Sdn. Bhd.	Malaysia
Phoenix Travel (Yeovil) Limited	United Kingdom
Prato Ascensori	Italy
Pratt & Whitney Canada Inc.	Canada
Pratt & Whitney S.A.R.L.	France
Precilec S.A.	France
Q-Carrier (B) Sendirian Berhad	Brunei
Ratier-Figeac	France
Ratier-Forest/G.S.P.	France
S. P. Electronics S.p.A.	Italy
SAFI-CONEL S.p.A.	Italy
Samico S.A.R.L.	France
Samsung-United Aerospace Co. Ltd.	Korea
SARI Otis (Gestion), S.A.	France
SARI Otis (Maintenance), S.A.	France
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Shenzhen Carrier Service Com- pany	Taiwan

SUBSIDIARIES AND AFFILIATES OF UNITED TECHNOLOGIES CORPORATION

<u>Name</u>	<u>State or Country of Incorporation</u>
Sito Realty Company, Inc.	Philippines
Societe de Connecteurs de Decazeville, S.A.R.L.	France
Societe Nationale d'Etude et de Construction de Moteurs d'Avia- tion	France
Societe Offranvillaise de Technolo- gie, S.A.	France
Societe Rhodanienne Ascenseurs e Monte-Charge	France
SODICA S.A.	France
Springer Carrier do Nordeste S.A.	Brazil
Springer Carrier S.A.	Brazil
Steelweld S.A.R.L.	France
Stephen Howe Limited	United Kingdom
Stigler Otis, S.p.A.	Italy
Tampereen Talohissi Oy	Finland
Tatung Otis Elevator Company	Taiwan
Telefunken electronic G.m.b.H.	West Germany
The Belton Corporation	Delaware
Trevino Transporte S.A. de C.V.	Mexico
Turbine Overhaul Services Pte. Ltd.	Singapore

SUBSIDIARIES AND AFFILIATES OF UNITED TECHNOLOGIES CORPORATION

<u>Name</u>	<u>State or Country of Incorporation</u>
Turborreactores, S.A. de C.V.	Mexico
U.D.D.-F.I.M., S.A.	France
United Technologies Automotive Italia, S.p.A.	Italy
United Technologies Gate Espana S.A.	Spain
United Technologies International Operations (Nigeria) Ltd.	Nigeria
United Technologies Saudi Arabia, Ltd.	Saudi Arabia
UT Insurance Company, Ltd.	Bermuda
UTG-United Technologies Grundig G.m.b.H.	West Germany
Val-Lift S.A.	Switzerland
Valmet Otis Oy	Finland
Vegotrans B.V.	Netherlands
Westland Finance Inc.	United States
Westland plc	United Kingdom
Zardoya Otis, S.A.	Spain

SUPPLEMENTAL BRIEF

MOTION FILED
JUL 10 1987

No. 86-492

IN THE
Supreme Court of the United States
OCTOBER TERM, 1986

DELBERT BOYLE, PERSONAL REPRESENTATIVE OF THE
HEIRS AND ESTATE OF DAVID A. BOYLE, DECEASED,
Petitioner,
v.

UNITED TECHNOLOGIES CORPORATION,
Respondent.

On Writ of Certiorari to the
United States Court of Appeals
for the Fourth Circuit

**MOTION FOR LEAVE TO FILE SUPPLEMENTAL BRIEF
AMICUS CURIAE ON BEHALF OF THE RESPONDENT
AND SUPPLEMENTAL BRIEF FOR THE
CHAMBER OF COMMERCE OF THE UNITED STATES
AS AMICUS CURIAE**

HERBERT L. FENSTER
Counsel of Record
RAYMOND B. BIAGINI
RISA H. RAHINSKY
CHARLOTTE D. YOUNG
MCKENNA, CONNER & CUNEO
1575 Eye Street, N.W.
Washington, D.C. 20005
(202) 789-7500
Attorneys for the Amicus Curiae

Of Counsel:

ROBIN S. CONRAD, ESQ.
NATIONAL CHAMBER
LITIGATION CENTER, INC.
1615 H Street, N.W.
Washington, D.C. 20062
(202) 463-5337

IN THE
Supreme Court of the United States

OCTOBER TERM, 1986

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DELBERT BOYLE, PERSONAL REPRESENTATIVE OF THE
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Respondent.

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for the Fourth Circuit

**MOTION FOR LEAVE TO FILE SUPPLEMENTAL BRIEF
AMICUS CURIAE ON BEHALF OF THE RESPONDENT**

The Chamber of Commerce of the United States, as *amicus curiae*, hereby moves for leave to file a supplemental *amicus curiae* brief, for the purpose of explaining the applicability of two recent Supreme Court decisions as they relate to the issues presented in *Boyle v. United Technologies Corporation*. The first case, *United States v. Johnson*, No. 85-2039 (U.S. May 18, 1987) was decided only three days prior to the filing of the Chamber's brief *amicus curiae*. The second decision, *United States v. Stanley*, No. 86-393 (U.S. June 25, 1987) was decided

approximately one month after the filing of the brief *amicus curiae*. These decisions reiterate the established principle that military judgments should not be second-guessed by the judiciary and thereby support the position of *amicus curiae* that the military nature of the procurement process warrants application of the government contract defense articulated in the brief *amicus curiae* of the Chamber of Commerce.

The attached supplemental brief is submitted to highlight the impact of these two decisions on the present case and *amicus curiae*'s position.

Respectfully submitted,

HERBERT L. FENSTER
Counsel of Record
 RAYMOND B. BIAGINI
 RISA H. RAHINSKY
 CHARLOTTE D. YOUNG
 MCKENNA, CONNER & CUNEO
 1575 Eye Street, N.W.
 Washington, D.C. 20005
 (202) 789-7500
Attorneys for the Amicus Curiae

Of Counsel:

ROBIN S. CONRAD, ESQ.
 NATIONAL CHAMBER
 LITIGATION CENTER, INC.
 1615 H Street, N.W.
 Washington, D.C. 20062
 (202) 463-5337

July 10, 1987

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<i>United States v. Stanley</i> , No. 86-393 (U.S. June 25, 1987)	2, 4, 5, 6

IN THE
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UNITED TECHNOLOGIES CORPORATION,
Respondent.

On Writ of Certiorari to the
United States Court of Appeals
for the Fourth Circuit

**SUPPLEMENTAL BRIEF AMICUS CURIAE OF THE
CHAMBER OF COMMERCE OF THE UNITED STATES
IN SUPPORT OF THE RESPONDENT**

Only three days prior to the filing of the brief *amicus curiae* of the Chamber of Commerce of the United States ("Chamber", in *Boyle v. United Technologies Corporation*, the United States Supreme Court rendered a decision in *United States v. Johnson*, No. 85-2039 (U.S. May 18, 1987), which furnishes additional support for the Chamber's position in support of the *Yearsley*-type government contract defense. Because of the imminent

filing date of May 21, 1987, the Chamber was unable to treat adequately this newly decided case as it relates to the issues presented in its brief *amicus curiae*. In addition, subsequent to the filing of the Chamber's brief, this Court decided *United States v. Stanley*, No. 86-393 (U.S. June 25, 1987), reemphasizing the Court's hesitation to involve the judiciary in military affairs, and thereby providing further support to the Chamber's proposed *Yearsley*-type government contract defense. Therefore, *amicus curiae* respectfully submits this supplemental brief, which briefly explains the importance and relevance of the decisions in *Johnson* and *Stanley* to the instant case.

In *United States v. Johnson*, this Court held that the *Feres* doctrine bars an FTCA action on behalf of a service member killed during activity incident to service, even if the alleged tort-feasor is a civilian employee or agency of the federal government. *Johnson*, slip op. at 4-10. Stating that the "Court has never suggested that the military status of the alleged tort-feasor is crucial to the application of the doctrine," *id.* at 5, this Court concluded that "[c]ivilian employees of the Government also may play an integral role in military activities." *Id.* at 9, n.11. The Court then echoed the very policy arguments against second-guessing military decisions made in the Chamber's brief *amicus curiae*, stating that "[e]ven if military negligence is not specifically alleged . . . a suit based upon service-related activity necessarily implicates the military judgments and decisions that are inextricably intertwined with the conduct of the military mission." *Id.* at 9.

A logical extension of the rationale in *Johnson* is that similar suits against the military contractor should be barred because the military contractor, like the civilian agency, plays an equally integral, if not greater, role in military activities. To permit suits against the military contractor inevitably will require the judiciary to delve into military matters and policies. As this Court noted

in *Johnson*, a suit based upon service-related activity "would involve the judiciary in sensitive military affairs at the expense of military discipline and effectiveness." *Id.* The carefully reasoned analysis of this Court regarding the impropriety of second-guessing military decisions that are intertwined with the military mission supports the Chamber's arguments set forth in Section I at 10-14 and Section C at 16-18 of its brief *amicus curiae*.

United States v. Johnson also supports the Chamber's argument urging the abandonment of the first element of the four-part government contract defense. See Brief *Amicus Curiae* at 4, n.3. In its present formulation, the first element of the government contract defense requires that the United States be immune from liability under the *Feres/Stencel* doctrine. As will be shown, this immunity requirement unduly limits application of the government contract defense to suits by military plaintiffs and has no logical basis.

In determining the scope of the *Feres/Stencel* bar in *Johnson*, the Court properly focused on the nature of the activity which caused the accident, i.e., was it a military product used for a military purpose. Extension of the *Feres/Stencel* bar was not conditioned upon whether the tort-feasor was a civilian agency or a military agency, but rather upon whether military decision making and policies would be implicated in a lawsuit. *Johnson*, slip op. at 4-5.

Similarly, application of the government contract defense should not turn on whether the plaintiff is a military serviceman or a civilian but rather on whether the judiciary will be required to delve into military matters. The irrationality of the *Feres/Stencel* requirement becomes apparent when the plaintiff is a civilian employee of the government suing a military contractor. There,

the United States is immune from suit not under *Feres/Stencel* but under the Federal Employees Compensation Act. Nevertheless, under the present formulation of the defense, the military contractor could not in that case invoke the government contract defense even though the lawsuit will require the judiciary to second-guess military decisions.¹ Hence, *amicus curiae* proposes that this Court eliminate the *Feres/Stencel* element of the defense completely so that, as argued by *amicus curiae* in its brief, the military nature and use of the product would govern whether the defense could be invoked, and not the nature of the plaintiff or tort-feasor.

In *United States v. Stanley*, this Court held that there is no colorable constitutional claim under the *Bivens* doctrine for injuries that “‘arise out of or are in the course of activity incident to service.’” *Stanley*, slip op. at 2, 14, citing *Feres v. United States*, 340 U.S. 135, 146 (1950). This Court explained that such actions are precluded because of “‘special factors counselling hesitation’—‘the unique disciplinary structure of the Military Establishment and Congress’ activity in the field,’” which extends “beyond the situation in which an officer-subordinate relationship exists” to the broader case where the alleged injury arises out of “activity incident to service.” *Stanley*, slip op. at 13-14, citing *Chappell v. Wallace*, 462 U.S. 296, 304 (1983), and *Feres v. United States*, 340 U.S. at 146. Specifically, this Court emphasized that the “special factor” that “counsels hesitation” in *Stanley* was “that congressionally uninvited intrusion into military affairs by the judiciary is inappropriate.” *Stanley*, slip op. at 13.

¹ Indeed, the Solicitor General also noted the problematic nature of the *Feres/Stencel* element of the government contract defense stating that “it is not clear that that is a proper element of the defense.” Brief for the United States as *Amicus Curiae*, *Boyle v. United Technologies Corp.*, at 16, n.13.

This same “special factor” should counsel the courts against finding government contractors liable in product liability actions brought by service personnel. As emphasized in the Chamber’s brief *amicus curiae*, the fundamental principle underlying the government contract defense is the impropriety of and judicial aversion to second-guessing military decisions. See Brief *Amicus Curiae* of the Chamber of Commerce of the United States at 5-14. This Court’s desire to uphold this principle is reflected throughout the decision in *Stanley*. In *Stanley*, this Court underscored the impropriety of judicial invasion into strictly military matters, stating that

[a] test for liability that depends on the extent to which particular suits would call into question military discipline and decision-making would itself require judicial inquiry into, and hence intrusion upon, military matters. Whether a case implicates those concerns would often be problematic, raising the prospect of compelled depositions and trial testimony by military officers concerning the details of their military commands. . . . [T]he mere process of arriving at correct conclusions would disrupt the military regime.

Stanley, slip op. at 12-13. Indeed, the same problem of second-guessing military decisions arises in the context of military procurement given the close and often symbiotic relationship between the military and its contractors. See Brief *Amicus Curiae* at 10-14.

This Court’s reaffirmance of the “incident to service test” as the test which requires “less extensive inquiry into military matters,” *id.* at 13, is the equivalent of the test proposed by *amicus curiae* in determining whether to apply the government contract defense. Under the *Yearsley*-type defense, the judiciary need only determine whether the injury was caused by a military product used for a military purpose or mission. See Brief *Amicus Curiae* at 14-18. Like the *Stanley* test, this test requires

much less judicial intrusion into military matters than the current version of the government contract defense. The simplicity yet reasonableness of the *Yearsley*-type defense parallels *Stanley*'s "incident to service" test and provides "a line that is relatively clear and that can be discerned" easily in application of the government contract defense.² *Stanley*, slip op. at 13.

² The *Yearsley*-type defense also recognizes the concerns expressed by Justice O'Connor in her dissent in *Stanley* that certain "deliberate and calculated" conduct "simply cannot be considered a part of the military mission" and therefore cannot insulate the government from liability. *Stanley*, slip op. at 2 (O'Connor, J., dissenting). Under the *Yearsley*-type defense, if the contractor deliberately acted outside the scope of the contract, e.g., by intentionally withholding information from the government concerning safety features or known risks, the government contractor would not be insulated from liability and the government contract defense would be inapplicable. See Brief *Amicus Curiae* at 16.

CONCLUSION

The recent decisions in *United States v. Johnson* and *United States v. Stanley* reaffirm the fundamental principle that actions by service personnel against the United States for damages arising out of activities incident to military service are precluded because the judiciary should not second-guess military judgments. The Chamber's *Yearsley*-type government contract defense upholds this principle in a simple but fair fashion by recognizing that government contractors, who play an integral role in military decision making, should be protected from liability where the injury is incident to military service, i.e., where a military product was used for a military purpose.

Respectfully submitted,

HERBERT L. FENSTER
Counsel of Record

RAYMOND B. BIAGINI

RISA H. RAHINSKY

CHARLOTTE D. YOUNG

McKENNA, CONNER & CUNEO

1575 Eye Street, N.W.

Washington, D.C. 20005

(202) 789-7500

Attorneys for the Amicus Curiae

Of Counsel:

ROBIN S. CONRAD, ESQ.

NATIONAL CHAMBER

LITIGATION CENTER, INC.

1615 H Street, N.W.

Washington, D.C. 20062

(202) 463-5337

July 10, 1987

REPLY BRIEF

19
No. 86-492

Supreme Court, U.S.
FILED
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JOSEPH F. SPANIOLO,
CLERK

In The
Supreme Court of the United States

October Term, 1986

— 0 —
DELBERT BOYLE, personal representative of the Heirs
and Estate of David A. Boyle, deceased,

Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

— 0 —
On Writ Of Certiorari To The United States
Court Of Appeals For The Fourth Circuit

— 0 —
REPLY BRIEF FOR PETITIONER

— 0 —
LOUIS S. FRANECKE, Esq.
JOHN O. MACK, Esq.
MACK, HAZLEWOOD,
FRANECKE & TINNEY
221 Pine Street, Suite 600
San Francisco, CA 94104
415/391-1560

MICHAEL MOORE, Esq.
CARTWRIGHT, SUCHERMAN
& SLOBODIN, INC.
101 California Street, 26th Floor
San Francisco, CA 94111
415/433-0440

Counsel for Petitioner

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TO: THE HONORABLE CHIEF JUSTICE AND ASSOCIATE JUSTICES OF THE SUPREME COURT OF THE UNITED STATES:

I.

A. THE JURY'S DETERMINATION OF THE ORIGIN OF THE CHIP IS NOT REVIEWABLE BY THIS COURT

This Court should uphold the jury verdict of the origin of the chip notwithstanding *Logan, infra* (Respondent's Brief, p.7).¹

The reasons are: 1) It is a violation of *Amendment VII, United States Constitution*, Right to Jury Trial; 2) The trial Judge did not instruct the jury on burden of proof under Virginia law and Respondent did not object (J.A. 451-465); 3) It has been improperly raised due to Respondent's failure to comply with Federal Rule 51. (Rule 51, Federal Rules of Civil Procedure) See *Kosak v. United States*, 465 U.S. 848, 850 n.3 (1984).

First, if the Virginia law per *Logan v. Montgomery Ward, Co.*, 216 Va 425, 219 S.E.2d 685 (1975) is correct, Respondent should have requested it in the jury charge. It did not. (JA 451-465) Only after the jury returned a verdict against Respondent, did Respondent raise the issue in their Brief to the Court of Appeals (Appellant Brief, pp. 20-22)² It cannot raise it now, if they did not object at the trial level. (FRCP, Rule 51)

Neither the Supreme Court nor the Court of Appeals can redetermine facts found by the jury. *Amendment VII United States Constitution; Atlantic and Gulf Stevedores, Inc. v. Ellerman Lines, Ltd.*, 82 S.Ct. 780, 369 U.S. 355 (1962); *Guzman v. Pichirilo*, 82 S.Ct. 1095, 369 U.S. 698 (1962).

It was a jury question if there were *equally* likely possible causes of the origin of the chip in the servo. (See *Logan, supra*) Without a proper charge to the jury, the

1. Hereinafter "R.B."

2. Hereinafter "A.B."

jury did not decide that. It was Respondent's obligation to object to the jury charge. (FRCP, Rule 51). They did not.

Even the Court of Appeal in its Opinion, recognized that the issue was hotly contested and that there was conflicting evidence. *Boyle v. United Technologies Corp.*, 792 F.2d 413, 416 (4Cir. 1986)

Third, this Court is not bound by the conclusions of lower Courts if a claim of violation of rights under the United States Constitution has been invoked. This Court will reexamine the evidentiary basis on which these conclusions are founded. See *Time, Inc. v. Pape*, 401 U.S. 286, 91 S.Ct. 633 (1971); *Niemotko v. Maryland*, 340 U.S. 268, 271, 71 S.Ct. 325, 327.

To raise *Logan* for the first time before the Court of Appeals and ask that Court to determine facts to establish its applicability to this case is a violation of Petitioner's right to a jury trial. *Art. VII, U.S. Const.*

B. THE DEFECT IN THE AUTOMATIC FLIGHT CONTROL SYSTEM IS PROPERLY BEFORE THIS COURT

Respondent argues that the defect in design of the flight control system ("AFCS") is not before this Court. (R.B., p. 8)

The Court found just the opposite by denying Respondent's motion for directed verdict on "all of the issues in the case for the reasons stated at the conclusion of Plaintiff's case" (J.A. 282-283, 441-442).

Petitioner did not waive any issues in the case.

Petitioner argued defect in the AFCS in his final argument (Trial transcript, page 630-631). Respondent also argued the issue in final argument. (Trial Transcript, pages 654-656).

The judge then charged the jury that "First, the (Plaintiff) claims that the Defendant, U.T.C., was negligent in the *design* and/or the rework of the helicopter involved in the accident". (J.A. 457). Further, the Judge

charged that Plaintiff claimed breach of warranty because of design defect. (J.A. 458).

The jury found against the Respondent.

The Respondent itself raised this issue to the Court of Appeals, "That There Was No Evidence To Support A Finding Of Any Defect In The Helicopter For Which Sikorsky Is Liable." (R.B., p. 16).

Respondent argued, "the only other defect in the helicopter alleged at trial, over objection, was a malfunction of the AFCS control system . . ." (R.B., p. 17). Respondent argued the redundancy of the system and that the system could be overcome (R.B., pp. 17-19).

Petitioner briefed the defect in the AFCS in response to Respondent's brief (Brief on Appeal, pp. 14-15).

In Petitioner's Writ of Certiorari, Petitioner raised the issue of the defective AFCS. (Petitioner's Writ, pages 9-11).

This issue is thus properly before this Court.

It is also clear that neither this Court nor the Court of Appeals can redetermine facts found by a jury as the determination of contradictory testimony is for the Trial Court and such determinations can be set aside on review only if clearly erroneous. See *Atlantic and Gulf Stevedores, Inc. v. Ellerman Lines, Ltd.*, 82 S.Ct. 780, 369 U.S. 355 (1962); *Guzman v. Pichirilo*, 82 S.Ct. 1095, 369 U.S. 698 (1962).

There is nothing that the jury found which is clearly erroneous.

II.

THE GOVERNMENT DID NOT ACCEPT DESIGN RESPONSIBILITY IN THIS CASE BY CONTRACT

Respondent argues that the contractual arrangement between manufacturer and the government entitled, "Design Responsibility" has no practical significance with regard to the application of a Government Contractor Defense in this case. (R.B., pp. 43-44) Respondents are either missing the whole point, or trying to hide the crux of it.

The government *specifically* stated that when it releases design data, drawings or aircraft for flight i.e. *approval*, "the government accepts no responsibility" for the successful operation of the equipment manufactured by the contractor, . . . " (J.A. 495, 498)

The language is clear. Any judicially imposed Government Contractor Defense, shifting that responsibility back to the government is a rewriting of the contract contrary to the government's intention, and not contemplated in the "approval" process.

III.

A GOVERNMENT CONTRACTOR DEFENSE AS SANCTIONED BY THE COURT OF APPEALS IN THIS CASE HAS NO PLACE IN THE JURISPRUDENCE OF THE UNITED STATES

A. INTRODUCTION

Petitioner objected at the trial to the inclusion of a jury charge on the Government Contractor Defense per FRCP Rule 51 (J.A. 445-448). The issue is thus properly before this Court.

B. CONGRESS HAS DECLINED TO ENACT A GOVERNMENT CONTRACTOR DEFENSE

Congress has control over the Department of Defense which is the largest single purchaser of goods and services in the nation. Each year, it enters into 15 million contracts, about 52,000 per day with some 60,000 prime contractors and hundreds of thousands of other suppliers and sub-contractors involving billions of dollars. KORB, *The Defense Budget and American Defense Annual* (1986-1987, p. 41 (Kruzel ad ed, 1986)

Congress has already heard the same arguments raised by Respondent in its brief and rejected them.

In 1984 Congress passed Section 794 of the *Department of Defense Appropriations Act*, FY1984, which provided that contractors for weapon systems must guarantee in writing that the system and its components were (1) *designed* and manufactured to conform to the govern-

ment's performance standards and (2) free from all defects.³ In the event of a failure, the contractor must bear the cost of prompt repair, replacement or reimbursement.

The purpose of Section 794 was to insure that the Defense Department purchases weapon systems which will work as they are intended.⁴

At the Congressional hearings, representatives of the contractors argued the same arguments as Respondent i.e. that adherence to Section 794 would increase the cost of national defense, would deter contractors from offering innovative approaches to defense needs, and would represent an unprecedented expansion of post-acceptance contingent liability facing all tiers of contractors.⁵ Others testified as to the unfairness of holding a contractor responsible for weapon system design that was developed or at least *approved* by the Government and was within the Government's compliance control with respect to technical details.⁶

Congressional response to these arguments are succinctly stated by Congressman Levine,

"Warranties do cost money; but the Pentagon's current build-now-test-later policy is costing tax payers billions of dollars and is bankrupting our defense budget. Isn't it better to make sure that an expensive

3. See, Joint Hearings, Warranties: Consideration of Section 794 The Department of Defense Appropriation's Act for fiscal year 1984, before the Sub-Committee on Procurement and Military Nuclear Systems and the Sub-Committee on Investigations on the House Committee on Arms Services, 98th Congress, 2nd Session IV (1985) (hereinafter, House Warranties Hearings)

4. Statement of Dr. Richard D. DeLauer, Under Secretary of the Defense for Research and Engineering. Statement of Managers and H.R. 5167 Conference Report, Congressional Record H 10304, September 26, 1984.

5. Senate Warranty Hearings, Statement of James R. Lincome, Executive Vice-President of Motorola, Inc. on behalf of the Electronics Industry Association, pages 84-87.

6. *Id.*, Statement of Machinery and Allied Products Institute, pages 140-143.

weapon works correctly from the beginning rather than cost the taxpayers enormous sums of money for repairs and spare parts to make the weapon work the way it was supposed to in the first place." House Warranties Hearing, at 5.

Thus, it must be asked, by what authority is the judiciary here asked to enact policies regarding weapons procurement which Congress has chosen to reject?

Also, closely related to the issue of warranties is the issue of indemnification of the contractors by the government.

Congress also declined to enact H.R.4083 and H.R. 4199, "Government Contractor's Product Liability and Indemnification Acts" dated March 14-15, 1984, 98th Congress, First Session, which provided government indemnity for suppliers of products to the government in certain cases *in which such suppliers become liable for loss with respect to those products*, and for other purposes.

Further, Senate bill 1254, "A Bill to Provide for an Equitable Reduction of Liability of Contractor with the United States in Certain Cases, to Provide a Comprehensive System for Indemnification by the United States and of its Contractors for Liability and in Excess of Reasonable Available Financial Protection, and for Other Purposes." 99th Congress, First Session, June 11, 1985, was not enacted.

Congress has repeatedly and emphatically rejected the contractors' position in favor of increased accountability.

C. THE VETERAN'S BENEFIT ACT IS NOT AN EXCLUSIVE REMEDY

Respondent argues that the *Veteran's Benefit Act*, (VBA), as amended, 38 U.S.C. § 301 et seq., providing compensations for servicemen or their families due to injury or death is a reason to uphold the Government Contractor Defense.

However, the VBA contains neither an implicit nor explicit declaration by Congress that it is the exclusive

remedy for a serviceman's injuries. See *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666, 675, 97 S.Ct. 2054, 2060 (1977).⁷

It is also clear that both before and after *Feres, infra*, this Court had permitted injured servicemen to bring Federal Tort Claim Act suits, even though they had been compensated under the VBA.⁸

In *Brooks v. United States*, 337 U.S. 49 (1949), this Court held that two servicemen injured off duty by a civilian Army employee could sue the government. The fact that they had already received VBA benefits in no way troubled the Court. This Court said, "nothing in the Tort Claims Act or the Veterans Laws . . . provides for *exclusiveness* of remedy" and we refuse to "call either remedy . . . *exclusive* . . . when Congress has not done so" *Id.* at 53. Under the three exclusivity provisions of the FTCA, 28 U.S.C. §§ 2672, 2676, 2679, the Congress said nothing about servicemen as plaintiffs.

Further, in *United States v. Brown*, 348 U.S. 110, 113 (1954), this Court again stressed that because, "Congress had given no indication that it made the right to compensation (under the VBA), the veterans' *exclusive* remedy . . . the receipt of disability payments . . . did not preclude recovery under the Tort Claims Act" *Id.* at 113.

Brooks and *Brown, supra*, (neither of which have ever been expressly disapproved) plainly hold that the VBA is not a "exclusive" remedy which places an "upper

7. The death benefit is only a range from \$40 per month to \$122 per month (with \$23 for each additional child after three children). 38 U.S.C. §§ 322, 342. The dependency and indemnity compensation to a surviving spouse (for death after December 31, 1956) ranges from \$491 to \$1,255 per month. 38 U.S.C. § 411.

Clearly, in today's economy, such a remedy does not fully compensate a widow and children for their loss, and Congress must have recognized this by not enacting this benefit to be exclusive.

8. 28 U.S.C. §§ 1346, 2671-2680.

limit" on government liability or, by analogy, the government contractors.⁹

Contrast the VBA with the Federal Employee's Compensation Act (FECA), 5 U.S.C. § 811(c), wherein Congress explicitly declared this remedy for civilian employees of the government to be exclusive.

See also 42 U.S.C. § 2212 enacted in 1984, where the Federal Government substitutes itself as a Defendant in any personal injury action brought against military contractors who participated in the U.S. atomic weapons program.

Thus, if Congress wants to act, it can do so. Congress has not enacted the Government Contractor Defense.

D. THE FEDERAL TORT CLAIMS ACT DOES NOT EXCLUDE SUITS AGAINST GOVERNMENT CONTRACTORS

If this Court adopts a Government Contractor Defense, it is, in essence, bypassing the Congress and adopting a defense that Congress has declined to enact in the

9. While the VBA may indeed be a "swift and efficient" remedy for servicemen, it is also an inequitable remedy. First, as one federal court has observed, "[The VBA] furnishes limited monthly benefits which may not fully compensate plaintiffs for the serious injuries alleged in the complaint." *In re "Agent Orange" Prod.Liab.Litig.*, (Agent Orange I), 506 F.Supp. at 746. See also, Note, *Stencel Aero Eng'g Corp. v. United States; An Expansion Of The Feres Doctrine To Include Military Contractors, Subcontractors And Suppliers*, 29 Hastings L.J. 1217, 1227 n. 66 (1978).

Additionally, VBA benefits do not constitute a vested right, but are only "a mere gratuity for which no suit can be maintained." *Silberschein v. United States*, 266 U.S. 221, 225 (1924). As such, these benefits can be temporarily forfeited if the veteran is incarcerated for a felony or misdemeanor offense, or permanently if the veteran is convicted of treason, sabotage or subversive activities. 38 U.S.C. § 3505. Veterans and their dependents are also barred from receiving any benefits if the veteran's period of service is terminated by "discharge or release under conditions other than honorable." 38 U.S.C. §§ 310, 331.

Federal Torts Claim Act of 1946, 28 U.S.C. §§ 1346, 2671-2680.

The Federal Tort Claims Act (28 U.S.C. §§ 1346, 2671-2680), in 1946, which has certain exceptions, does not include a Government Contractor Defense.

In *Bivens v. Six Unknown Named Agents of Federal Bureau of Narcotics*, 403 U.S. 388 (1971), it was, in dictum, inferred that this Court should not act when there are "special factors counseling hesitation in the absence of affirmative action by Congress" (403 U.S., at 396) or where there is an "explicit congressional declaration" that another remedy's exclusivity would bar such an action. See *Davis v. Passman*, 442 U.S. 228, at 246-247 (1979).

In *Chappell v. Wallace*, 462 U.S. 296, at 300 (1983), this Court observed that the Constitution explicitly conferred upon Congress the power "to make rules for the government and regulation of the land and naval forces." *U.S. Constitution Article I, Section 8, Clause 14*, showing that, "the Constitution contemplated that the legislative branch have plenary control over the rights, duties, and responsibilities in the framework of the military establishment . . ." 462 U.S., at 301.

Congress is noted by this Court to have exercised that authority to "establish a comprehensive internal system of justice to regulate military life, taking into account the special patterns that define the military structure." *Id.* at 302.

Congress, under the FTCA, enacted the only exception for servicemen: "any claim arising out of the combatant activities of the military or naval forces, or the Coast Guard, during time of war" 28 U.S.C. § 2680(J).

Thus, Congress specifically considered, and provided what it thought necessary for the special requirements of the military.¹⁰

10. The other exceptions as set forth in the FTCA are 2) those arising out of a particular area of government activity including
(Continued on following page)

**E. THE COMPETITION AND CONTRACTING ACT
AND FEDERAL ACQUISITION REGULATIONS
ARE FURTHER EVIDENCE OF
CONGRESSIONAL INTENT**

In 1984, Congress continued to hold government contractors at arm's length by preventing "sole source" procurement, which had made special relationships with certain companies that would be assured of subsequent orders for follow-up supplies. *The Competition and Contracting Act* (Pub.L. 98-369, 98 Stat. 1175) and *The Defense Procurement Reform Act* (Pub.L. 98-525, 98 Stat. 2492), established a competition advocate program in all military departments and executive agencies. Now, except for specifically defined circumstances, the government must follow a rigid procedure for stimulating competition on every procurement.

Indeed, Congress has impliedly also acted to hold Government Contractors at arms length for their actions by various Federal Acquisition Regulations (FAR) Part 31. Among other things, when the government is of the opinion that the contractor has produced products or services that do not conform to the contract specifications, there are a wide range of administrative, civil and criminal sanctions.¹¹

(Continued from previous page)

physical operations of the Treasury; and 3) those arising out of certain types of torts, such as admiralty suits "for which a remedy is provided". See generally 2 L.Jayson, *Handling Federal Tort Claims; Administrative and Judicial Remedies* 235-66 (1982); Comment, *The Supreme Court and The Tort Claims Act: End Of An Enlightened Era*, 27 Clev.St.L.Rev. 267, 270 (1978).

11. The government may:

- a) Disallow and refuse to pay costs it considers inappropriate (FAR 31.204);
- b) Unilaterally reduce the contract price if it determines that defective pricing occurred (10 U.S.C. § 2306(f)(2));
- (c) Suspend progress payments (FAR 52.232-16);

(Continued on following page)

**F. THERE IS NO HISTORICAL PRECEDENT FOR
THE ADOPTION OF A GOVERNMENT
CONTRACTOR DEFENSE**

Respondent and Amici have cited *Yearsley v. W.A. Ross Construction Company*, 309 U.S. 18 (1940), as being the "historic purpose" for not imposing liability on contractors who follow government specifications. *Yearsley, supra*, a dredging case, is easily distinguished.

First, in virtually all of this line of cases, the Court emphasizes the contractor's: 1) compliance with precise specifications *established by the government*; and 2) *lack of discretion or control over the design* of the project.¹²

By contrast, any of the tests urged by Respondent gives the contractor the discretion to establish the design of military products, subject only to government *approval* of "reasonably precise specifications." Thus, military contractors, unlike contractors in early construction cases,

(Continued from previous page)

- d) Collect alleged contractor indebtedness to the government by means of administrative off sets (31 U.S.C. § 3716);
- e) Rescind any contract if there has been a final bribery or graft conviction (18 U.S.C. § 218);
- f) Bring a civil suit for false claims seeking double damages, etc. (31 U.S.C. § 3729);
- g) Suspend or debar the company from doing business with the government (FAR subpart 9.4) and
- h) Initiate criminal prosecution.

12. See, e.g., *Littlehale v. E.I. du Pont de Nemours*, 268 F.Supp., at 802 (contractor had no "freedom of choice as to manufacture, design, or use of materials") [emphasis added]; *Leininger v. Stearns-Roger Mfg. Co.*, 17 Utah 2d 37, 41, 404 P.2d 33, 36 (1965), (defendant "did not design, sell or recommend the installation of such fans, and had no discretion in their selection) [emphasis added]; *Roland v. Jumper Creek Draining Dist.*, 4 F.2d 719, 722 (S.D. Fla. 1925), (contractor could not be held liable for flood damage "pursuant to the plans and specifications [of the state government] under the supervision of the engineer of the Drainage District"); See also, Note *supra* note 63, at 1035-36.

cannot claim that they are merely executing the design of another.¹³

Second, it has been held by many Courts, in the context of modern Strict Liability, that contractors merely following the specifications of another should be held liable for product design defects.¹⁴

Finally, in many of the early construction cases, the Courts emphasized that even if private contractors were shielded from liability, Plaintiffs might still have recourse against the government itself.¹⁵ By contrast, in cases involving injured members of the armed forces or government, there is no recourse against the military because of the immunity it enjoys under *Feres, supra*.

IV.

PRACTICAL REASONS AGAINST THE GOVERNMENT CONTRACTOR DEFENSE

A. THE GOVERNMENT CONTRACTOR DEFENSE WILL ITSELF DISRUPT MILITARY MISSION AND DISCIPLINE

The judiciary has always intervened to protect important rights of military personnel that might be threatened.

In recent years, the judiciary has been increasingly more active in protecting the Constitutional rights of servicemen and civilians, against abuse by the military.¹⁶

13. For a detailed factual discussion of the submission of bids, see *Washington Mechanical Contractors, Inc. v. Department of the Navy*, 612 F.Supp. 1243 (B.C.Col. 1984).

14. *Tozer v. L.T.V. Corp.*, 792 F.2d at 407 (1986).

15. See, e.g., *Yearsley v. W. A. Ross Construction Co.*, 309 U.S., at 22. (U.S. government might be liable to landowner for Fifth Amendment "taking" of private property); *Myers v. United States*, 323 F.2d, at 583, (plaintiff directed to Court of Claims to pursue Fifth Amendment action against the federal government).

16. See, e.g., *Hogopain v. Knowlton*, 470 F.2d 201 (2d Cir. 1972), (West Point Academy student entitled under Due Pro-

(Continued on following page)

Oddly, *McKay v. Rockwell International Corporation*, 704 F.2d 444 (9th Cir. 1983), and its progeny, not relying on any empirical data and no actual support, improperly reasoned that not to allow the Government Contractor Defense would force the Courts into inquiry which would disrupt military discipline or military mission. In fact, the opposite is true.

The defense is an affirmative one which must be proven by the Defendant. Only if the defense is allowed, will potential conflicting military testimony be necessary as defendants attempt to show that it was the military which specifically requested the product despite knowledge of the defect.

If the Military Contractor Defense is rejected, there would be no need to scrutinize the military's role.

It must be remembered that the Government Contractor Defense is only a few years old, and the system of tort liability has gotten along very well for lo these many years without it.

This Court has repeatedly referred to the, "particular and special relationship of the soldier to his superiors" and to the need for, "immediate compliance with military procedures and orders". *Chappell v. Wallace*, 462 U.S. 296,

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cess Clause to hearing before he could be expelled); *Mindes v. Seaman*, 453 F.2d 197 (5th Cir. 1971), (court martial conviction alleged to involve constitutional errors subject to judicial review); *Flower v. United States*, 407 U.S. 197, 199 (1971), (court recognizes right of private public interest group to distribute leaflets on military base); *Spock v. David*, 469 F.2d 1047, 1055-56, (court upholds right of Presidential candidate to distribute literature on military base); See also Note, From *Feres* to *Stencel*: Should Military Personnel Have Access To FTCA Recovery?, 77 Mich. L. Rev. 1099, 1109-10 (1979); Comment, Army Drug Treatment Programs And The Doctrine Of Military Necessity: Committee For G.I. Rights v. Callaway And United States v. Ruiz, 10 Harv. C.R.-C.L. L. Rev. 215, 236-37 (1975); Sherman, Legal Inadequacies And Doctrinal Restraints In Controlling The Military, 49 Ind. L.S. 539 (1974).

at 305 (quoting *United States v. Brown*, 348 U.S. 110, 112 (1954)).

However, there is an obvious and important distinction between *Chappell, supra*, and the present case. Namely, that Respondent UNITED TECHNOLOGIES is not Appellant BOYLE'S Superior Officer. (See *United States v. Stanley*, No. 86-393 (1987) (Dissent)). Even in *Chappell, supra*, this Court said, with good reason, that any analysis would be "guided" not governed by concerns under *Feres*. (*Stanley*, Dissent, *supra*).

A serviceman's product liability action against the contractor would only indirectly implicate military decision making. The primary focus in such a case would be on the design and manufacturing decisions made by the contractor or a knowledgeable acceptance of a defect by the military.¹⁷

Second, as one writer recently noted, the greater potential threat to military discipline arises in the context of suits by servicemen in combat situations, or against immediate superior officers. By contrast, suits involving military equipment procurement decisions, involve authorities far removed from the military base or combat situations, and thus "there is no comparable adverse effect on military discipline."¹⁸

Also, it is well accepted that when determining whether and what kind of immunity is required for government

17. 778 F.2d, at 743, ("likelihood of profound disruption [of military discipline] is negligible from testimony in suits against military contractors"); See also Note, The Government Contractor Defense: Preserving The Government's Discretionary Design Decisions, *McKay v. Rockwell International Corp.*, 57 Temp. L.Q. 697, 719 n. 144 (1984).

18. Comment, Tort Remedies For Servicemen Injured By Military Equipment: A Case For Federal Common Law, 50 N.Y.U. L. Rev. 601, 633-34 & n. 179; Cf. *Johnson v. United States*, 749 F.2d 1530, 1539-40 (11th Cir. 1985) (wrongful death action against United States on behalf of serviceman killed through negligence of United States civilian air traffic controllers not barred by *Feres* since no effect on military discipline).

officials, this Court's decision is informed by the common law. The Common Law does not immunize superior officers in civilian Courts.¹⁹ See *Nixon v. Fitzgerald*, 457 U.S. 731, 747 (1982); *Mitchell v. Forsyth*, 472 U.S. 511 (1985); *Butz v. Economou*, 438 U.S. 478 (1978).

B. ABSENCE OF A GOVERNMENT CONTRACTOR DEFENSE WOULD HAVE NO ADVERSE EFFECT ON MILITARY PROCUREMENT

Respondent argues that if the contractors are not shielded from liability they might be deterred from working with the government on designing new products, or might abstain from working on important projects. Yet, Respondent also argues, in direct contradiction, that the contractors held liable for defective product design would simply pass these costs on to the government. Thus, there would appear to be no real threat that they would shy away from military projects.

However, the actual empirical evidence indicates that the imposition of liability for servicemen's product related injuries would not significantly increase the cost of doing business to government contractors:

"The most comprehensive recent study on product liability insurance indicates that the existence or non-existence of the Government Contractor Defense has little effect on the manufacturers' rates. The rates of product liability insurance are based largely on intangible factors as opposed to actuarial conditions such as the number or size of claims. The real impact of actuarial analysis on the final rate is minimal."²⁰

19. Even at common law, military superiors receive no exceptions from the general rule that officials may be held accountable for their actions and damages in civil Court of law. See W. Winthrop, *Military Law and Precedents* 880-885 (2d Ed. 1920) and see Zillman, *Interim Military Tort Law; Incident to Service Meets Constitution Tort*, 60 N.C. Law Review, 489, 498, 499 (1982).

20. Comment, *Strict Liability Suits For Design Defects In Military Products: All The King's Men, All The King's Privileges?*, 10 U. Dayton L. Rev. 117, 136 (1984); citing the Interagency Task Force on Product Liability, U.S. Department of Commerce, *Final Report of Study I-40* (1977).

C. THERE IS NO COST SAVINGS JUSTIFICATION FOR SUCH DEFENSE

First, there is little factual support for the assertion that the manufacturers will pass on higher costs to the government. This would suggest that the military is wholly passive in accepting prices offered. Yet, Congress and the Pentagon have arduously sought to promote competition for procurement contracts. (See III E above).

Second, Respondent's argument of cost justification completely ignores the fact that avoidable accidents involving servicemen and weaponry have high costs for the military. The loss of these resources is a waste that cannot serve the interest of national security. For example, the loss of the "Shuttle" cost a billion dollars while the loss of 7 lives, cost only a small fraction of that number.

Third, the cost justification appears to be an invention of the 9th Circuit. See *McKay, supra*. There is nothing in *Feres* or *Stencel* or any other Supreme Court decision which suggests that the basis for barring a serviceman's claim is fear of high prices.

Fourth, if the rationale for the Military Contractor Defense is protection of the public treasury, why are civilians . . . injured as a result of defective design products . . . permitted to sue? No Court has ever held that servicemen should have less rights than their civilian counterparts because the need to protect the public treasury is an onus uniquely theirs to bear.

Fifth, it must be asked whether the judiciary has the authority to create a legal defense in order to reduce the cost of military procurement. That is a matter for Congress.

The imposition of certain tort liability shifts the often overwhelming cost of a product related accident from the innocent victim to the manufacturer, "spreading the cost of compensating the victims throughout society as a cost of doing business by the manufacturer."²¹

21. *Rawlings v. D.M. Oliver, Inc.*, 97 Cal.App.3d 890, 897, 159 Cal.Rptr. 119, 122 (1979).

If the elimination of the Government Contractor Defense would shift the cost of product related accidents from individual servicemen to society, as taxpayers, we might have to pay slightly more for the military products. Yet, society is the ultimate beneficiary of the protection that our armed forces provide. Cost is the least objection.

The imposition of strict liability provides an economic incentive to manufacturers to improve product safety by forcing them to internalize the primary accident cost associated with their products.²²

Finally, it is also argued that the disallowing of the Government Contractor Defense would result in a pass through of liability costs to the government and obviate its immunity under *Feres*. This argument is suspect in light of *Stencel Aero Eng'g Corp. v. United States*, 431 U.S. 666 (1977).

In *Stencel, supra*, the Court indicated that its holding would not be undermined by contractor's efforts to recoup liability loss through the contract negotiation process.

"Since the First Circuit case to hold (indemnification) actions barred by *Feres* was decided in 1964, Petitioner no doubt had sufficient notice (on the government immunity) so as to take this into account in negotiating its contract."²³

Additionally, the imposition of liability on Government Contractors should ultimately save the government money. As the 11th Circuit observed in *Shaw v. Grumman Aerospace Corp.*, 117 F.2d 736 (1985), the imposition

22. *Sachs, supra* n.92, at 275-76; see also, Calabresi, Product Liability: Curse Or Bulwark? Of Free Enterprise, 27 Clev. St. L. Rev. 313, 322 (1978).

23. 431 U.S. 666. See also, Comment, The Government Contractor Defense: Should Manufacturer Discretion Preclude Its Availability?, 37 Me. L. Rev. 187, 205 (1985).

of tort liability on Government Contractors may, "promote better designed planes and fewer costly accidents."²⁴

D. CIVILIAN JURIES HAVE ABILITY TO DEAL WITH MILITARY AND GOVERNMENTAL MATTERS

The Courts have consistently rejected the contention that a jury necessarily must have "familiarity and experience" with the product before it can rationally decide a case.²⁵ Juries, aided by expert witnesses, have been allowed to decide actions involving complex anti-trust and securities issues, as well as cases relating to advanced technologies such as nuclear power plants and genetic engineering.²⁶

It is yet to be explained why actions involving military products are sufficiently *sui generis* to justify nullifying the traditional province of the jury.

V.

THE "SHAW" TEST IS THE BEST APPLICATION OF ACCEPTABLE PRINCIPLES OF CONTRACTS AND TORTS TO A GOVERNMENT CONTRACTOR DEFENSE

24. *Id.* at 741. See also *In re Agent Orange Prod. Liab. Litig.* (Agent Orange I), 506 F.Supp., at 793; Comment, *supra* note 90, at 208; Souk, Government Contracts and Tort Liability: Time For Reform, 30 Fed. B. News & J. 70, 73 (1983). The Shaw court also correctly pointed out that this "pass-through" argument is "inconsistent with the general tolerance of the same practice in manufacturing defect cases" involving military equipment. 778 F.2d, at 742. See also *Johnston v. United States*, 568 F.Supp., at 357.

25. See, e.g., *Standard Oil Co. of Cal. v. Arizona*, 738 F.2d 1021, 1031-32 (9th Cir. 1984) (right to jury trial upheld in complex antitrust action); *In re U.S. Fin. Sec. Litig.*, 609 F.2d 411, 431 (9th Cir. 1979), cert. denied sub nom., *Gant v. Union Bank*, 446 U.S. 929 (1980) (right to jury upheld in complex securities litigation). See also Demetrio, Should Juries Decide Complex Cases?, 21 Trial 45, 47 (1985).

26. *In re U.S. Fin. Sec. Litig.*, 609 F.2d, at 428. See also Lempert, Civil Juries And Complex Cases: Let's Not Rush To Judgment, 80 Mich. L.Rev. 68, 113-15 (1981).

If this Court decides to adopt a Government Contractor Defense, the Shaw test is the most logical.²⁷

Respondent and Amici have paraded a consistent criticism and rejection of the Shaw test primarily on grounds that it would create more work. (R.B., pp. 36-40) This is totally inconsistent with the entire purpose of the Government Contractor Defense.

If there is such a "going back and forth" between the manufacturers and the government, why is it that the contractors are so steadfastly opposed to a test that provides for them, with their "enormous experience and skill in helping to meet military equipment needs" (R.B., p. 35), to communicate defects, dangers, and alternative designs for the ultimate decision to be made by the government?

The Shaw test first requires the manufacturer to prove that it did not participate or participated only minimally in the entire design process. This appears to be what the Respondent has been alleging they do all along.

Second, Shaw merely requires that the contractor prove that it forewarned the government of the defect or

27. The Eleventh Circuit chose a different standard than McKay and Agent Orange lines of cases. In *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736, the court held that a contractor could only invoke the "military contractor defense" if it can prove: "(1) that it did not participate, or participated only minimally, in the design of these products, or parts of products, shown to be defective; or (2) that it timely warned the military of the risks of the design and notified it of alternative designs reasonably known by the contractor, and that the military, although warned, clearly authorized the contractor to proceed with the dangerous design." *Id.* at 746 (emphasis added).

The first prong of Shaw establishes a middle ground between the McKay standard, which permits extensive contractor participation in the product-design process, and Agent Orange, which ostensibly allows virtually no contractor input into this process.

The second prong of the Shaw test is similar to the modified third prong of Agent Orange, placing the onus on government contractors to disclose hazards they knew, or reasonably should have known about.

danger. What could be simpler? It is even qualified, in the manufacturer's favor, by only requiring that which would be reasonably known and which would fall within good design practices in the industry (a negligence consideration).

Respondent argues that this would create more paperwork.

This is an incongruous argument when the government is spending billions of dollars and risking thousands of lives. More paperwork is no reason.

Who tells the government of the alternate designs and defects which may be present?

All of the tests adopted by the various circuits fail to address the crux of the entire issue, "Does the government *have actual* knowledge of the defect or design it is buying?" Does the government have the information to weigh the risks versus its military or government function?

In the *Shaw* test, all the jury would have to determine is that the military was presented with alternatives and selected one of them. The reasons for this selection would not have to be inquired into.

VI.

CONCLUSION

This Court should reverse the 4th Circuit Court of Appeals, Eliminate the Government Contractor Defense and Reinstate the jury verdict. In the alternative, remand for further proceedings in accordance with this Court's decisions.

Respectfully submitted,

/s/ LOUIS S. FRANECKE, Esq.
MACK, HAZLEWOOD,
FRANECKE & TINNEY

SUPPLEMENTAL BRIEF

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Supreme Court, U.S.
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No. 86-492

IN THE
Supreme Court of the United States

October Term, 1986

DELBERT BOYLE, Personal Representative Of The
Heirs and Estate of David A. Boyle, Deceased,
Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,
Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT
OF APPEALS FOR THE FOURTH CIRCUIT

SUPPLEMENTAL BRIEF FOR THE RESPONDENT

LEWIS T. BOOKER
(Counsel of Record)
RICHARD H. BURTON
LONNIE D. NUNLEY, III
Hunton & Williams
Richmond, Virginia 23212
(804) 788-8200

Counsel for Respondent

Of Counsel:

PHILIP A. LACOVARA
MARK A. DOMBROFF
Hughes Hubbard & Reed
Washington, D.C. 20004
(202) 626-6200

W. STANFIELD JOHNSON
Crowell & Moring
Washington, D.C. 20004
(202) 624-2500

October 2, 1987

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RULE 28.1 LISTING

A Rule 28.1 Listing was previously made on behalf of United Technologies Corporation in the Brief For The Respondent, filed May 21, 1987.

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ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE FOURTH CIRCUIT

SUPPLEMENTAL BRIEF FOR THE RESPONDENT

On May 21, 1987, Respondent United Technologies Corporation (UTC) filed its Brief For The Respondent. On June 25, 1987, this Court decided two cases which concern matters relevant to the issues before the Court in this case. The two cases, *Solorio v. United States*, No. 85-1581 (55 U.S.L.W. 5038) and *United States v. Stanley*, No. 86-393 (55 U.S.L.W. 5101), represent late authorities not available in time to be included in UTC's brief on the merits. Accordingly, UTC respectfully submits this Supplemental Brief pursuant to Supreme Court Rule 35.5.

ARGUMENT

The United States Court of Appeals for the Fourth Circuit, in ruling for UTC below, held that a military

contractor is not liable for injuries caused by an alleged design defect in a product supplied to the military if the contractor proves the affirmative defense known as the military contractor defense. *Boyle v. United Technologies Corporation*, 792 F. 2d 423, 424 (4th Cir. 1986). The Courts of Appeals for the Second, Third, Fifth, Seventh, Ninth and Eleventh Circuits also have sustained the validity of this defense.

As these courts have recognized, the defense is necessary to preserve the constitutional separation of powers between the executive and legislative branches on the one hand, and the judicial branch on the other. This Court's recent decisions in *Solorio v. United States* and *United States v. Stanley* reenforce this rationale for sustaining the military contractor defense.

1. In *Solorio*, the Court returned to the traditional "military status" test for deciding when military courts may assert court-martial jurisdiction over an accused. Under that test, the special rules and procedures of the military justice system automatically apply to an accused who commits an offense while a member of the armed forces, regardless of whether the offense itself is connected with his military service. In deciding to discard the more imprecise "service connection" test adopted in 1969, the Court pointed to several constitutional policies that are equally apt here.

First, the Court quoted the observation in *Burns v. Wilson*, 346 U.S. 137, 140 (1953) (plurality opinion), that:

"[T]he rights of men in the armed forces must perforce be conditioned to meet certain overriding demands of discipline and duty, and the civil courts are not the agencies which must determine the precise balance to be struck in this adjustment. The Framers expressly entrusted that task to Congress."

Solorio v. United States, above, 55 U.S.L.W. at 5039.

Second, the Court pointed to its long course of decisions that have "emphasized that Congress has primary responsibility for the delicate task of balancing the rights of servicemen against the needs of the military." *Id.* at 5041. Third, the Court observed that years of experience with the less precise test for court-martial jurisdiction had substantiated the belief that "civil courts are 'ill-equipped' to establish policies regarding matters of military concern . . ." *Id.* And finally, the Court expressed concern that the vague test had "proved confusing and difficult . . . to apply." *Id.*

For reasons that we have addressed at greater length in our principal brief, these policies strongly counsel recognizing the military contractor defense as the court below formulated it. Under the constitutional allocation of powers the executive and legislative branches are responsible for equipping the armed forces. Civilian courts and juries have neither the constitutional authority nor the practical competence to sit in judgment on decisions made by the military about the design of weapons systems and materiel furnished to members of the armed forces. The military contractor defense, as applied by the court below, draws a clear and sound line that renders non-justiciable any disputes involving design decisions for which the military departments are accountable, either because they initiated the challenged design or approved reasonably precise specifications for it.

2. The Court's other recent decision, *United States v. Stanley*, underscores the importance of using a bright-line test, when one is apparent, in order to separate justiciable tort claims from those that courts should not entertain. In *Stanley*, the Court analyzed the policies that animated *Feres v. United States*, 340 U.S. 135 (1950) and its progeny and held that a serviceman may

not bring a constitutional tort action, complaining of injury suffered "incident to service," even if the defendants are not his direct superiors in the chain-of-command and even if some of the defendants allegedly responsible for his injuries "may well have been civilian personnel . . ." 55 U.S.L.W. at 5104.

Although the tortious acts alleged in *Stanley* were willful and egregious, the Court insisted on the importance of an easily applied test that forecloses tort suits by servicemen for injuries arising out of their military service. Specifically, the Court rejected petitioner's proposal that the courts be allowed to decide on a case-by-case basis "the degree of disruption" that entertaining a particular claim would engender. 55 U.S.L.W. at 5104. The Court's rationale in *Stanley* is highly pertinent to this case:

Stanley underestimates the degree of disruption that would be caused by the rule he proposes. A test for liability that depends on the extent to which particular suits would call into question military discipline and decision-making would itself require judicial inquiry into, and hence intrusion upon, military matters. *Id.* at 5104-05.

As this Court explained:

Whether a case implicates those concerns would often be problematic, raising the prospect of compelled depositions and trial testimony by military officers concerning the details of their military commands. Even putting aside the risk of erroneous judicial conclusions (which would becloud military decision-making), the mere process of arriving at correct conclusions would disrupt the military regime. The 'incident to service' test, by contrast, provides a line that is relatively clear and that can be discerned with less extensive inquiry into military matters. *Id.*

These same considerations refute Petitioner's argu-

ment, based on the Eleventh Circuit's approach in *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985), *petition for cert. pending*, No. 85-1529, that this Court should make the military contractor defense depend on an elaborate inquiry into the relative degrees of knowledge, initiative and sophistication on the part of the technical advisers and military procurement officials. If civil courts and juries were required to probe precisely how a particular design concept emerged from the minds of hundreds of government employees and private engineers, and to assess which of them possessed the greatest knowledge and expertise, that kind of case-by-case investigation into "military . . . decision-making would itself require judicial inquiry into, and hence intrusion upon, military matters." *Id.* at 5105. Similarly, Petitioner's approach would not merely raise the "prospect of compelled depositions and trial testimony by military officers concerning the details of the military commands," *id.*, it would demand disruptive scrutiny.

Under the *Shaw* test, urged by Petitioner and his *amici*, a contractor defending a design-defect claim would be required as part of its trial defense to develop testimony from members of the military concerning the various choices made during the design of the product. This type of testimony would involve such uniquely military decisions as, for example, why external armor on a tank was sacrificed, at the expense of the crew's safety, for greater ammunition storage capacity, or why an anti-missile system for a warship was designed with a single aft firing location, as opposed to dual fore and aft firing locations. Members of the military, both those who made the design choices and those who benefitted or suffered as a result of the choices, would have to square off in a civilian court arguing why the design was appropriate or inappropriate.

This process would necessarily damage the military procurement system and military discipline in general. The fact that the United States may not be a formal party to the suit would not lessen the disruptive impact of Petitioner's approach. As in *Stanley, above*, Petitioner "underestimates the degree of disruption that would be caused by the rule he proposes." 55 U.S.L.W. at 5104.

By contrast, the underpinnings of the decisions in *Solorio* and *Stanley* similarly discourage ill-defined and imprecise inquiries into relative responsibility, knowledge, initiative and sophistication in applying the military contractor defense. The defense, as articulated and applied below, focuses on straightforward issues that will rarely require review of military decisions and testimony from the military departments: Did the military department approve reasonably precise design specifications concerning the design features or concept at issue?—an answer that is ordinarily easy to document without testimony from military officials. And did the contractor actually know of a latent problem that was not also known to the military?—an unlikely subject of further litigation in the typical case, since it arises only where the contractor actually knew of a latent defect.

3. Finally, in his brief before this Court (at 41), Petitioner refers to the standard "design responsibility" clause contained in Sikorsky's contract with the Navy for the CH-53D helicopter at issue. Although he did not argue below that this standard contractual clause somehow negated the Navy's actual approval of the design specifications for the escape system, counsel for Petitioner did advance that argument in another case, prompting a recently published opinion rejecting the claim. In *Wilson v. Boeing Co.*, 655 F. Supp. 766 (E.D. Pa. 1987), the court agreed with the interpretation of that clause set out in our principal brief (at 43-45) and ruled

that the standard "design responsibility" clause "cannot be construed to abrogate the government contractor defense;" rather, "the public policy justifications for adoption of the government contractor defense outlined in *Koutsoubos v. Boeing Vertol*, 755 F.2d 352 (3rd Cir.); *cert. denied*, ____ U.S. ____, 106 S.Ct. 72 (1985)], apply with equal force regardless of this provision." *Id.* at 773.

CONCLUSION

The judgment of the Court of Appeals should be affirmed.

Respectfully submitted,

LEWIS T. BOOKER
(Counsel of Record)
RICHARD H. BURTON
LONNIE D. NUNLEY, III
Hunton & Williams
Richmond, Virginia

COUNSEL FOR RESPONDENT

Of Counsel:

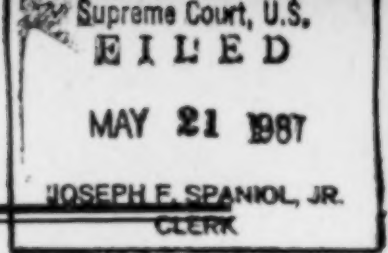
PHILIP A. LACOVARA
MARK A. DOMBROFF
Hughes Hubbard & Reed
Washington, D.C.

W. STANFIELD JOHNSON
Crowell & Moring
Washington, D.C.

AMICUS CURIAE

BRIEF

(14)
No. 86-492



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v.

UNITED TECHNOLOGIES CORPORATION

ON WRIT OF CERTIORARI TO THE UNITED STATES
COURT OF APPEALS FOR THE FOURTH CIRCUIT

**BRIEF FOR THE UNITED STATES AS AMICUS CURIAE
SUPPORTING AFFIRMANCE**

CHARLES FRIED

Solicitor General

RICHARD K. WILLARD

Assistant Attorney General

DONALD B. AYER

Deputy Solicitor General

JAMES M. SPEARS

ROBERT L. WILLMORE

Deputy Assistant Attorneys General

CHRISTOPHER J. WRIGHT

Assistant to the Solicitor General

ROBERT S. GREENSPAN

Attorney

Department of Justice

Washington, D.C. 20530

(202) 633-2217

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QUESTION PRESENTED

Whether a military contractor that manufactured a helicopter in accordance with detailed design specifications developed by the contractor but approved by the Navy is shielded from liability for design defects where the contractor was not aware of any hazards in the design of the helicopter that were not known by the Navy.

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*ON WRIT OF CERTIORARI TO THE UNITED STATES
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**BRIEF FOR THE UNITED STATES AS AMICUS CURIAE
SUPPORTING AFFIRMANCE**

INTEREST OF THE UNITED STATES

Petitioner is the representative of a Marine who drowned after his helicopter crashed into the ocean, allegedly because of the defective design of the helicopter's egress system. This case presents the question whether, where the Navy is well aware of those aspects of the physical configuration of the helicopter said to constitute design defects, the contractor that designed the helicopter in conjunction with the Navy may defend on the basis that the Navy approved the design. Whether this military contractor defense is available, and what a contractor must prove to establish it, will affect the process by which the military procures weapons systems and the safety and effectiveness of that equipment. The United States is interested in assuring that the armed forces

can efficiently obtain military products that work effectively and operate as safely as possible.¹

STATEMENT

1. The CH-53 helicopter was designed primarily to carry marines and cargo from aircraft carriers to beaches. J.A. 291. On April 27, 1983, a CH-53 helicopter that had taken off from an aircraft carrier as part of a training exercise crashed into the Atlantic Ocean near Virginia Beach, Virginia, with four persons aboard. They did not suffer serious injuries on impact, and three of them escaped from the helicopter, which sank to the mud about 35 feet below the surface. The co-pilot, First Lieutenant David Boyle, did not escape. His body was subsequently found in the helicopter. J.A. 78-80.

Petitioner, Lieutenant Boyle's representative, subsequently brought suit against respondent, the manufacturer of the helicopter, contending inter alia (see note 1, *supra*, and note 3, *infra*) that the CH-53's egress system was defectively designed in two ways and that those defects caused Lieutenant Boyle's death.² First, in

¹ In addition to alleging that respondent defectively designed the helicopter, petitioner also claimed that respondent negligently serviced the helicopter in which petitioner's decedent was riding by introducing a metal clip into its machinery that caused it to crash. The court of appeals held that judgment should have been ordered in favor of respondent on that issue because, under applicable state law, the evidence was not sufficient to support a finding that respondent introduced the chip into the helicopter's machinery. This brief does not address that issue.

² Petitioner contended, and the court instructed, that the jury could find liability under either a negligence theory or a theory of breach of implied warranty. J.A. 457-460. We draw no distinction between those theories in this brief because we contend that the military contractor defense is equally applicable under both theories of liability, a proposition with which the district court agreed. J.A. 461. See *Tozer v. LTV Corp.*, 792 F.2d 403, 408 (4th Cir. 1986), petition for cert. pending, No. 86-674.

order to open the window emergency exit alongside the co-pilot's seat, the co-pilot must turn an escape hatch handle that, in some configurations, may be within four inches of a device called the collective stick. See J.A. 580-581 (pictures of the escape hatch handle and the collective stick). Petitioner contended that it was difficult for Lieutenant Boyle to reach the escape hatch handle because of its placement in relation to the collective stick. Second, the co-pilot's window opened outward after the escape hatch handle was turned. See J.A. 582-584 (pictures of person escaping through the co-pilot's window). Petitioner contended that the design was defective because it is difficult to open the window after a crash at sea while the helicopter is sinking because of the water pressure. He further argued that marks on Lieutenant Boyle's hands supported the theory that he attempted to open the hatch but was blocked by the collective stick or could not open it because of the water pressure. See J.A. 79.³

Respondent defended in part by relying on what is commonly known as the military contractor defense, under which it is necessary to establish that the military approved reasonably detailed specifications for the design of the allegedly defectively designed weapons system. One of respondent's employees, Thomas Dixon, testified in detail about the procedures leading to the manufacture of the CH-53 (J.A. 284-293). The process began in January 1962 with the issuance of a type specification by the Navy (J.A. 544-549), which generally described what tasks the Navy wanted the CH-53 to perform, along with

³ Petitioner also argues (Br. 11-15) that the helicopter's control system was defectively designed and that that caused the crash. However, the district court ruled that the only design defect claim that would be submitted to the jury was the claim that the egress system was defectively designed and petitioner did not object to that ruling. J.A. 442-443, 458-459. Accordingly, the only alleged defect that petitioner has not waived involves the design of the egress system.

a request for proposals. In addition to the type specification, contractors desiring to build the CH-53 were constrained in their proposals by a number of Department of Defense specifications, including specifications issued in 1959 for the design of helicopters (J.A. 514-528).

Following the submission of proposals, the Sikorsky Division of United Aircraft Corporation⁴ obtained the contract to build the CH-53. After extensive discussions between Sikorsky employees and Navy employees (J.A. 292-293), the Navy in November 1962 issued detailed specifications for the CH-53 (J.A. 529-539) and in December 1962 it issued demonstration requirements (J.A. 550-558). As part of this process, Sikorsky was required to build a cockpit mock-up, which included the collective stick and the escape hatches (J.A. 301). The Navy inspected the cockpit mock-up and its configuration was approved (*ibid.*).⁵ The cockpit design of the CH-53D model of the helicopter (the model in which Lieutenant Boyle was flying) did not differ from the design the Navy approved (*id.* at 302).

2. The district court instructed the jury that petitioner could not recover if it concluded that respondent proved "by a preponderance of the evidence these three things. One, that the United States Navy established or approved the specifications for the co-pilot egress system; two, that the helicopter conformed to these specifications; and three, that the United States Navy knew as much or more than the defendant about the helicopter's hazards and therefore defendant did not need to warn the government of the dangers involved in the use of the equipment." J.A. 461. The district court further explained: "It is not necessary

⁴ United Aircraft Corporation is now respondent United Technologies Corporation.

⁵ The CH-53 was subsequently built at Sikorsky's plant, at which more than 100 Navy employees, including engineers and quality control administrators, worked at the time of the trial (J.A. 298). Each CH-53 was tested by a Navy test pilot before being accepted by the Navy (*ibid.*).

for the defendant * * * to prove that the government established every exact detail of the egress system. However, the defendant must prove by a preponderance of the evidence that the United States Navy specifications were more than just general requirements or that the Navy examined or agreed to a detailed description of the system." *Ibid.*

The jury, which was instructed in the alternative that it could find respondent liable if it concluded that it had negligently serviced the helicopter in 1982 (see note 1, *supra*), returned a general verdict finding respondent liable and awarding petitioner \$725,000 (J.A. 466). Respondent moved for judgment notwithstanding the verdict, which was denied (*id.* at 468).

3. The court of appeals reversed. Following its own decision announced the same day in *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986), petition for cert. pending, No. 86-674, the court held that "[a] military contractor can escape liability for a design defect if he can demonstrate that 1) the United States is immune from liability; 2) the United States approved reasonably precise specifications for the equipment; 3) the equipment conformed to those specifications; and 4) the supplier warned the United States about dangers in the use of the equipment that were known to the supplier but not to the United States." Pet. App. A5-A6. Accord *McKay v. Rockwell International Corp.*, 704 F.2d 444, 451 (9th Cir. 1983), cert. denied, 464 U.S. 1043 (1984).

Applying that test, the court took note of "the back-and-forth discussions between Sikorsky and the Navy" concerning the design and specifications of the helicopter, and concluded that "this type of exchange of information will normally suffice to establish government approval of the design in question" (Pet. App. A6). It further observed that a mock-up of the cockpit had been built by Sikorsky, with the collective stick and the emergency escape hatch in their actual positions, and that mock-up was studied and approved by the Navy. The court concluded that the Navy had approved reasonably detailed specifica-

tions for the escape hatch. It also stated that the Navy thereafter accepted the helicopter involved in this case as fully complying with specifications, and had had 13 years' experience with it prior to the time of the crash in issue. *Ibid.* Finding "nothing in the record that indicates there were any hazards of which Sikorsky was aware and the Navy was not," the court concluded that Sikorsky's duty to warn the Navy "was not brought into question" (*ibid.*), and instructed the district court to enter judgment for respondent (*id.* at A4).

SUMMARY OF ARGUMENT

The procurement process for weapons systems and associated specifically military products proceeds by a long-term cooperative interaction of employees of the military and its contractors, and the military benefits from the expertise of contractors in designing weapons systems. The military is nonetheless ultimately in control of the specifications of the products it purchases, which are often inherently dangerous.

The courts of appeals have, for a variety of reasons and without exception, recognized a special defense available to contractors who supply military products. Such a defense is necessary because, in the absence of a military contractor defense, contractors could avoid liability for design defects only by refusing to play any substantial role in the design process, which would deprive the military of their valuable assistance. In addition, weapons systems cannot be designed to be as safe as ordinary consumer products without sacrificing their primary objectives, and it is unfair to charge a contractor with liability for a hazardous design necessitated by the product's military purpose. Furthermore, lawsuits by service members against military contractors alleging that weapons systems were defectively designed will generally call military judgments into question and will disrupt the cooperative working relationship necessary if the procurement process is to operate efficiently. Finally, the defense

is justified to prevent the military from indirectly bearing the cost of accidents where it is immune from direct suit.

The military contractor defense was properly applied by the court below. By requiring that the military approve reasonably detailed specifications for the allegedly defective product, the test enunciated ensures that a military judgment is at issue. The characteristics of the CH-53's egress system alleged to constitute the design defects were well known to the Navy, as a result of its intensive involvement in the development of the CH-53. There is thus no basis on which to suggest that respondent failed to discharge a duty to warn the Navy of the supposed hazards.

The version of the military contractor defense preferred by petitioner—which was set out in *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985), petition for cert. pending, No. 85-1529—requires a contractor to either (1) avoid any role in the design of a military product; or (2) (a) warn the military about potential hazards of the design, including hazards reasonably known to manufacturers of analogous civilian products, and (b) obtain a specific waiver from the military. The *Shaw* version of the military contractor test is not a practical alternative. First, it gives contractors incentive not to work closely with the military, which may deprive the military of needed expertise. Second, by evaluating the conduct of military contractors under a standard of care applicable to manufacturers of consumer products, the *Shaw* version provides an incentive to perform testing and safety evaluation that will interfere with the military's interest in obtaining weapons systems quickly and efficiently. Third, by requiring detailed warnings by contractors—and explicit acknowledgments by the military—on almost every conceivable matter, the *Shaw* version is likely to produce a voluminous paper record that will cause delay and perhaps result in the obfuscation of real safety hazards.

Under the *Shaw* version of the test, respondent would not be shielded, even though the Navy approved the

design specifications and the configuration of the cockpit as exemplified by a mock-up that made the alleged defects clear. Under that version of the defense, respondent should have submitted a form stating that in certain specific situations emergency egress might be more difficult because the collective stick was near the escape hatch handle and the window opened outward, and should have obtained the Navy's approval to go forward. If contractors are required to provide such warnings in order to be covered by the defense, the procurement process will be delayed unnecessarily. Indeed, the focus on producing a paper record will likely interfere with the military's goal of procuring effective weapons systems that are as safe as practicable.

ARGUMENT

RESPONDENT SHOULD NOT BE HELD LIABLE FOR DEFECTS IN A MILITARY PRODUCT WHERE THE MILITARY APPROVED REASONABLY DETAILED DESIGN SPECIFICATIONS, THE PRODUCT WAS BUILT IN CONFORMITY WITH THE DESIGN SPECIFICATIONS, AND THE ALLEGEDLY DEFECTIVE CHARACTERISTICS WERE WELL-KNOWN TO THE MILITARY

If the United States contracts for a product with express and mandatory specifications, the manufacturer cannot be held to account for executing that directive. *Yearsley v. W.A. Ross Construction Co.*, 309 U.S. 18 (1940). The manufacturer is an agent of the government, acting pursuant to its command. *Murray's Lessee v. Hoboken Land & Improvement Co.*, 59 U.S. (18 How.) 272, 283 (1854). Thus, it follows that if the United States establishes design specifications for a given product and directs a contractor to produce the product, the contractor cannot be held to account under state law for defects in the product's design.⁶

⁶ A manufacturer is generally not liable under state law for following defective design specifications set by another party. Restatement (Second) of Torts § 404 comment a (1965).

In most instances, however, the relationship between the military and its contractors is more complex. The development of weapons systems involves design, performance, and production criteria, some of which the government sets at the outset in detail and some of which are left for formulation during the design process. Even when the specifications are mandatory, the contractor may have played a significant role in their development and formulation. On the other hand, even when the contractor develops the design and the military only approves it, the contractor is undoubtedly constrained and influenced in making its design decisions by specifications issued by the military to govern the design of the product.⁷

It is nonetheless true that the military is always in control of the final design of a weapons system. It not only provides general direction by telling contractors in its requests for proposals what tasks it wants the product to perform and by providing other instructions in its standing performance and design specifications for that sort of product (see J.A. 284-293)—it also approves the final design specifications, however they may have been developed. Thus, the military does not buy weapons systems off the lot, as consumers commonly buy automobiles. Rather, "there can be no question that the design of military equipment is, at bottom, a military decision." *Bynum v. FMC Corp.*, 770 F.2d 556, 569 (5th Cir. 1985).

Military products differ from consumer goods in another significant respect: their primary purpose is aiding in the defense of the nation, a goal which is often

⁷ It is therefore sometimes difficult to single out either the government or the contractor as the party responsible for a particular design feature because the development of military products is almost always a joint effort. Cf. *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736, 743 (11th Cir. 1985), petition for cert. pending, No. 85-1529 ("the more closely the contractor and the military work together, the more difficult it is to determine exactly who made design decisions").

in tension with the objective of protecting the user. Given the purposes for which they are built, the designs of military products are quite often different from the designs of analogous consumer products. A fighter aircraft must be fast enough and maneuverable enough to evade and destroy enemy aircraft. A design that maximizes speed and maneuverability will not have the redundant systems common to commercial airliners. See *Shaw v. Grumman*, *supra*. Further, some military products, like the rotating turret gun mounted on a cargo carrier that cause the injury in *Bynum*, are inherently dangerous and are not comparable to any consumer product. Injuries will inevitably occur when such dangerous equipment is used. As these examples illustrate, while safety is an important factor in the design of military products, it is not the most important factor, and weapons systems cannot be designed in the same manner as consumer products.

A. A Military Contractor Defense Is Necessary To Permit The Armed Forces To Procure Effective Military Equipment In An Efficient Manner And To Avoid Judicial Scrutiny Of Military Procurement Decisions

A number of considerations have led courts to recognize a special defense available to the manufacturers of products essential to the military mission.⁸ *In re "Agent Orange" Product Liability Litigation*, No. 85-6163 (2d Cir. Apr. 21, 1987), slip op. 7249-7251; *Tozer v. LTV Corp.*, 792 F.2d 403, 405-408 (4th Cir. 1986); *Shaw*, 778 F.2d at 740-744; *Bynum*, 770 F.2d at 564-567; *Tillett v. J.I. Case Co.*, 756 F.2d 591, 597 (7th Cir. 1985); *Koutsoubos v. Boeing Vertol, Division of Boeing Co.*, 755 F.2d 352, 354-355 (3d Cir. 1985); *McKay v. Rockwell International Corp.*, 704 F.2d 444, 449-451 (9th Cir. 1983).

⁸ Cases will no doubt arise where there is some question as to whether the allegedly defective product was a "military product." See *Tillett v. J.I. Case Co.*, 756 F.2d 591, 598 (7th Cir. 1985). There is no dispute that the CH-53 is such a product.

The driving forces behind recognition of a military contractor defense are the effects, both direct and indirect, of litigation in calling into question military judgments concerning equipment safety and related matters, thus impairing the federal government's constitutional authority to defend the country. U.S. Const. Art. I, § 8 Cls. 11-14; Art II, § 2, Cl. 1. All courts except for the Eleventh Circuit in *Shaw* have adopted essentially the same form of the test.⁹

The availability of the military contractor defense is a matter of federal common law because, as the Court noted in *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666 (1977) the relationship between the government and its suppliers of ordnance is no less "distinctively federal in character" than the relationship between the

⁹ Petitioner complains (Br. 20-22) that the jury was instructed under the formulation of the military contractor defense originally set forth by the district court in *In re "Agent Orange" Product Liability Litigation*, 534 F. Supp. 1046, 1055 (E.D.N.Y. 1982), modified, 597 F. Supp. 740, 843-850 (E.D.N.Y. 1984), applied, 611 F. Supp. 1223, 1263-1264 (E.D.N.Y. 1985), aff'd, No. 85-6163 (2d Cir. Apr. 21, 1981), while the court of appeals adopted and applied the *McKay* test. Specifically, he urges that the district court's test and court of appeals' test differ materially in their articulation of the contractor's duty to warn. In that regard, he is mistaken.

The district court required the jury to find, as a necessary element of the defense, that the "Navy knew as much or more than the defendant about the helicopter's hazards and therefore defendant did not need to warn the government of the dangers involved in the use of the equipment" (J.A. 461). Under the test applied by the court of appeals, the defense is conditioned upon the contractor "warn[ing] the United States about dangers in the use of the equipment that were known to the supplier but not to the United States." Pet. App. A5-A6. Under both tests, the contractor loses the protection of the defense where the United States is unaware of a particular hazard, and the contractor, though aware of it, fails to give a warning.

In any event, the duty to warn is irrelevant to the outcome of this case, since the United States was indisputably aware of the characteristics of the egress system said to constitute a hazard. See pages 23-24, *infra*.

government and its service members (431 U.S. at 672). See also *United States v. Johnson*, No. 85-2039 (May 18, 1987), slip op. 7-8. Thus, a suit by a service member against one of the government's suppliers of ordnance gives "rise to uniquely federal interests sufficient to warrant the imposition of federal law." *Bynum v. FMC Corp.*, 770 F.2d 556, 570 (5th Cir. 1985). See *Clearfield Trust Co. v. United States*, 318 U.S. 363, 366-367 (1943). But see *Brown v. Caterpillar Tractor Co.*, 696 F.2d 246 (3d Cir. 1982).

Absent the military contractor defense, suits alleging hazardous design of weapons systems may lead contractors to decline to participate in the design process. The design alternatives explored in the context of military contracting necessarily depend upon uniquely military considerations which may require foregoing a margin of safety in order to satisfy other mission criteria. As the Fifth Circuit noted in *Bynum* (770 F.2d at 569): "Often dangerous designs must be used in the military context to meet the exigencies of our national defense, and even military equipment that is relatively safe for every day use may have to be operated on occasion under dangerous conditions or in a manner creating a high risk of harm." Similarly, it is necessary, given the nature of the military mission, "to push technology towards its limits and thereby to incur risks beyond those that would be acceptable for ordinary consumer goods." *McKay*, 704 F.2d at 449-450. Moreover, it is clear that, in the absence of a military contractor defense, military contractors could be held liable for large amounts in the event of a war.¹⁰

¹⁰ Should the nation become involved in a major armed conflict, a large number of injuries and deaths would inevitably result. In the absence of a military contractor defense, it seems likely that defense contractors would ultimately pay a large amount in claims resulting from such a conflict. See *In re "Agent Orange" Product Liability Litigation*, No. 84-6213 (2d Cir. Apr. 21, 1987) (affirming \$180 million class settlement in a case involving a class of Vietnam veterans, while claims of those who opted out of the class were

Given that military contractors are potentially exposed to massive liability if they aid in the design of military products but may not be found liable if they merely manufacture weapons systems following government orders (see page 8, *supra*), the failure to recognize a military contractor defense would give contractors a powerful incentive not to participate in the design process. That would, in turn, gravely interfere with the military's procurement of effective weapons systems because the military benefits from the expertise of its contractors. The military contractor defense is thus necessary because it allows contractors to share with the government their expertise as to design matters without shedding the protection from liability they would enjoy if they merely followed orders.

In addition to disrupting the procurement process, it would also be unfair to hold a contractor responsible for a design dictated by a product's military mission. *Bynum*, 770 F.2d at 566.¹¹ Moreover, the unfairness to the

dismissed under the military contractor defense (No. 85-6163 (Apr. 21, 1987)).

Amicus Shaw suggests (Br. 26) that it is nevertheless unnecessary to recognize a military contractor defense, since "the 'weapons procurement process' worked very well for decades upon decades before anyone ever intuited the need for such a defense." He overlooks the fact, recounted by amicus Association of Trial Lawyers of America (Br. 9-10), that products liability law was revolutionized by *Greenman v. Yuba Power Products, Inc.*, 59 Cal. 2d 57, 377 P.2d 897, 27 Cal. Rptr. 697 (1963), and liability is now imposed on manufacturers in a broad range of cases where they were previously not subject to suit.

¹¹ The design of a military product is most likely to be found defective if a fact-finder, ignoring the product's military mission, compares it to an analogous consumer product, and the resulting liability is particularly unfair. For example, in *Shaw* the defective design at issue was the lack of a redundant longitudinal flight control system for a fighter aircraft based on aircraft carriers. The district court noted that redundancy was a design universally found in commercial aircraft. 85-1529 Pet. App. 2-10, para. 53. The district court in that case recognized that installation of a re-

contractor would be aggravated by the fact that the government is generally immune from liability for design defects, either under *Feres* in the case of injured service members or under the discretionary function exception in the case of other injured persons. See *United States v. S.A. Empresa de Viacao Aerea Rio Grandense (Varig Airlines)*, 467 U.S. 797, 808-811, 819-820 (1984); *Dalehite v. United States*, 346 U.S. 15, 35-36 (1953). Thus, in the absence of such a defense a contractor that aided the military in designing a weapons system would be solely liable for injury caused by the product, even if the hazardous aspects of the design in question were clearly necessary so that the product could perform its military function.¹²

Suits by injured service members against military contractors alleging that the injuries were caused by defective designs of military products would have harmful indirect effects as well. This Court has more than once noted the "peculiar and special relationship of the soldier to his superiors," and the harmful effects on military discipline and effectiveness of litigation against the government concerning injuries to members of the armed forces sustained in the course of duty. *Chappell v. Wal-*

dundant system on the carrier-based fighter aircraft would result in a "weight penalty and increase complexity." *Id.* at 2-11, para. 56. However, the court did not consider whether the weight penalty would have prevented the aircraft from fulfilling its military mission. If the lack of a redundant longitudinal flight control system was required so that the aircraft could perform the tasks required of it by the Navy, the contractor could not fairly be charged with designing a hazardous aircraft, even though the lack of a back-up system would clearly mean that the failure of the primary system would lead to a crash.

¹² The courts have observed that recognition of the military contractor defense does not leave service members without a remedy for their injuries. "The Veterans' Benefits Act 'provides a swift, efficient remedy for the injured servicemen.'" *Tozer*, 792 F.2d at 407 (quoting *Stencel Aero Engineering Corp.*, 431 U.S. at 673). See also *Johnson*, slip op. 8-9. Accordingly, recognition of the military contractor defense is not unfair to them.

lace, 462 U.S. 296, 299 (1983) (quoting *United States v. Muniz*, 374 U.S. 150, 162 (1963)); see also *United States v. Johnson*, No. 85-2039 (May 18, 1987), slip op. 9-10; *United States v. Shearer*, 473 U.S. 52, 57-59 (1985). While consistently refusing to allow actions by soldiers against the government seeking to remedy injuries incurred incident to service under *Feres v. United States*, 340 U.S. 135 (1950), the Court has also declined to construe the Federal Tort Claims Act as authorizing indemnification suits brought against the United States by contractors that have been sued by service members, on the ground that such suits would have the same adverse consequences as direct suits, even though the service member was not nominally a party-plaintiff. "[W]here the case concerns an injury sustained by a soldier while on duty, the effect of the action upon military discipline is identical whether the suit is brought by the soldier directly or by a third party. * * * The trial would, in either case, involve second-guessing military orders, and would often require members of the Armed Services to testify in court as to each other's decisions and actions." *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666, 673 (1977).

In formulating the military contractor defense, the courts of appeals have likewise recognized that the substitution of a contractor for the United States in an action arising from a service members' injuries does little to eliminate the deleterious consequences of the litigation on military discipline. "Litigation involving defective designs in military products would take the identical form regardless of whether the named defendant happens to be the government or the military contractor. In either case, members of the armed services would be allowed to question military decisions and obtain relief from actions of military officials." *Bynum*, 770 F.2d at 565. This follows from the fact that "[m]ilitary contractors ordinarily work so closely with the military * * * that it is nearly impossible to contend that the

contractor defectively designed a piece of equipment without actively criticizing a military decision." *Tozer*, 792 F.2d at 406.

This Court has consistently recognized, however, that the Third Branch should not normally review military decisions. "The complex, subtle, and professional decisions as to the composition, training, equipping and control of a military force are essentially professional military judgments, subject *always* to civilian control of the Legislative and Executive Branches." *Gilligan v. Morgan*, 413 U.S. 1, 10 (1973) (emphasis in original).¹³

Finally, a failure to adopt a military contractor defense would indirectly raise the cost of weaponry, especially in light of the potentially vast liability to which defense contractors would be subject: "[M]ilitary suppliers, despite the government's immunity, would pass the cost of accidents off to the United States through cost

¹³ Military judgments on design matters should not be subjected to judicial second-guessing in suits brought against the United States, whether the plaintiff is a service member or a civilian, because, in addition to the government's immunity from suit by service members, Congress has immunized design judgments from liability under the discretionary function exception to the Federal Tort Claims Act. See page 14, *supra*. While the court in *McKay* concluded that the military contractor defense should apply only where the government is immune under *Feres* and *Stencel Aero Engineering Corp.* (704 F.2d at 451), so that military judgments on design matters would be subject to indirect review in a case brought by a civilian against a contractor, it is not clear that that is a proper element of the defense. See note 14, *infra*. It may be that contractors manufacturing military products should be immune from liability for alleged design defects whenever the government is immune, thus totally shielding design decisions from scrutiny. Cf. *Johnson*, slip op. 9 (Scalia, J., dissenting) (criticizing *Feres* because "[i]f Johnson's helicopter had crashed into a civilian's home, the homeowner could have brought an FTCA suit that would have invaded the sanctity of military decisionmaking"). In any event, even if the contractors were subject to suit by civilians alleging that they were injured as a result of a design defect in a military product, the practical consequences would be slight since the vast majority of those injured by such products are likely to be service members.

overrun provisions in equipment contracts, through reflecting the price of liability insurance in the contracts, or through higher prices in later equipment sales." *McKay*, 704 F.2d at 449. Under *Stencel Aero Engineering Corp.*, the United States is not to be held indirectly liable for those costs, unless it chooses to assume them, just as under *Feres* it is not directly liable.

B. The Military Contractor Defense Should Apply Where The Military Approved Reasonably Detailed Specifications And Was Fully Aware Of The Characteristics Of The Product Alleged To Constitute A Defect

1. The court of appeals here applied a version of the military contractor defense first enunciated by the Ninth Circuit in *McKay* (see Pet. App. A5-A6). It requires that (1) the United States approved reasonably precise specifications for the equipment; (2) the equipment conformed to those specifications; and (3) the contractor warned the United States about dangers inherent in the product as specified which were known to the contractor but not to the United States. *McKay*, 704 F.2d at 451.¹⁴ We believe that that articulation implements the concerns underlying the military contractor defense in a balanced and effective manner.

It is appropriate that the military contractor defense apply only where the military has either established or approved the design specifications that are alleged to have caused a service member's injury, so that it is clear that military judgments are truly implicated. As we have stated, the concern that such judgments not be second-guessed is one of the bases for the defense.¹⁵ On

¹⁴ The test also requires that the United States is immune from liability under *Feres* and *Stencel*. *McKay*, 704 F.2d at 451. No issue concerning that requirement is presented here, since Lieutenant Boyle clearly died incident to his military service.

¹⁵ We do not mean to suggest that in order to establish the defense a contractor should be required to show that a particular

the other hand, where no military judgment relating to specific design choices was made, so that the design was truly the contractor's, it is not unfair to hold the contractor liable.¹⁶ And where a hazardous design feature was in fact not accepted by conscious choice of the government, it is less likely that the contractor would be able to pass the cost on to the military purchaser, so that the liability would actually be absorbed by the contractor, rather than becoming simply a hidden cost of military procurement.

It also seems obvious that the defense should apply only when the product conformed to the specifications. No military judgment is called into question where a contractor did not do what the government ordered it to do.¹⁷

design decision reflected a conscious choice to sacrifice a degree of safety to the necessities of the military mission. Such a showing might be possible in some cases. In *Shaw*, for example, it seems clear that the military chose to sacrifice the safety provided by a redundant longitudinal flight control system to the need for light weight in a carrier-based attack aircraft (see note 11, *supra*). In many cases, however, it would be difficult to pinpoint which of the numerous specifications constraining designers required a particular trade-off. Where the military has played a substantial part in the development of equipment—as it did here and as it almost invariably does in obtaining weapons systems—a showing that reasonably detailed design specifications were approved by the military following a back-and-forth discussion engaged in by employees of the military should establish the fact that a military judgment was made. See Pet. App. A6; *Tozer*, 492 F.2d at 407.

¹⁶ The requirement that the military was involved in the design process will not interfere with the procurement process in a major way because the military rarely purchases any weapons system without being actively involved in its development.

¹⁷ Contracts to produce weapons systems typically contain various provisions regarding tests and analysis of the product and its component parts. Those provisions are properly viewed as specifications. If a contractor fails to perform such obligations required by the contract, or performs them inadequately, and as a result fails to discover a hazard, then the contractor did not comply with the contract specifications and should not be shielded by the defense.

It is also a necessary condition of the defense that the contractor warn the military about dangers actually known to it but not known to the military. While the government is a sophisticated and competent participant in the process of weapons design and manufacture, it is not necessarily aware of every risk about which its contractors know. The relationship between the military and its contractors is improved on the whole by a requirement that ensures that the information flowing from contractors to the military is as full and frank as is reasonably possible and that all risks and dangers known to contractors have been disclosed. The military's interest in protecting the well-being of service members is advanced by such a requirement.

2. The alternative version of the military contractor defense that petitioner prefers (Br. 40) is the test formulated by the Eleventh Circuit in *Shaw*. Under that test, a contractor is shielded from liability only (1) where the contractor played essentially no part in the design of the product; or (2) (a) the contractor warned the military not only of design risks and alternatives actually known to them, but of those that should reasonably be known to the contractor under the standards of the industry, defined to include civilian as well as military producers of similar items; and (b) the military responded to the warning with a "knowing approv[al]" that is "obviously related and responsive to the relevant warning." 778 F.2d at 744-746.

Under this first prong of this test, contractors that seek out (or are compelled to perform)¹⁸ military contractors are given an incentive to avoid as much as possible all participation in the design process. For only by its lack of participation in creating the design criteria can a contractor satisfy the first prong of the test and avoid the

¹⁸ The Defense Production Act of 1950, 50 U.S.C. App. 2071(a) gives the Executive Branch authority to require a private contractor to accept military contracts.

great uncertainties imposed by the broadly formulated duty to warn. This would be significantly disruptive of the cooperative joint enterprise by which most weaponry is presently designed and produced.¹⁹

The second prong of the test imposes a standard of imputed knowledge which substantially expands the responsibilities as well as the potential liability of a contractor. For under the test, what a contractor is held to know is measured in part by the design practices of manufacturers that produce similar products for civilian consumption.²⁰ Application of the test will, therefore, provide military contractors with a strong incentive to engage in testing and safety evaluation beyond that required under the military contract. This will involve reevaluation by contractors of the design specifications furnished (or approved) by the government (*Bynum*, 770 F.2d at 576), which will, in turn, necessarily involve both delay and increased cost to the government. In significant respects, therefore, it amounts to judicial intrusion upon "decisions that are better left to the military and the political branches of government" (*ibid.*).

In addition to the requirement of warnings in a broad and uncertain range of situations not required under the *McKay* test, the *Shaw* test imposes as an additional condition precedent to the defense a requirement that the

¹⁹ Moreover, it will not normally be possible to satisfy this prong of the test. The development of weapons systems usually requires contractors and the government to work together closely in the design, testing, and manufacture of the desired weapon: "The contractor and the military pool their expertise, matching the latest advances in military technology with the specific dictates of the mission." *Tozer*, 798 F.2d at 407. Design criteria can only be specified with the absoluteness required by the first prong of the *Shaw* test in areas where technology is established and the capacities of manufacturers are settled and known.

²⁰ In *Shaw*, the standard of design practice was derived from those of "the aircraft design industry * * * civilian or military." 778 F.2d at 746 n.17.

military approve the subject design in a manner "obviously related and responsive to the relevant warning" (778 F.2d at 746). Indeed, it goes yet a step further and allows consideration of evidence of the "military's own level of relevant knowledge and expertise" (*ibid.*), which the court assumed was relatively low, presumably as bearing on the informed and deliberate character of its concurrence in the design. The test thus virtually ensures the creation of a new, mountainous paper record in connection with every procurement contract, and would lead to a substantial alteration in the procurement process. In response to the contractor's incantation that one or the other particular aspect of a military product is not as safe as it would be if it were designed for non-military uses, it appears that the military would similarly have to respond in words evidencing not only its desire to proceed nonetheless, but also its specific understanding of the defect being "waived" and its own expertise to make that judgment. Unless the military alters its procurement process in this way, under the *Shaw* test contractors who perform the military's bidding will be accountable in tort. In addition, such an alteration of the procurement process may reasonably be expected to obscure those matters upon which serious discussion between a contractor and the military ought to focus, to the detriment of the safety of our nation's service members.²¹

²¹ Amicus *Shaw* (Br. 20-21, 26-29) and amicus *Tozer* (Br. 3-4) suggest that the position taken by the government here conflicts with statements made by government officials in testimony concerning bills to provide indemnification from the United States to government contractors in cases involving injuries to military personnel. There is no contradiction. Acting Assistant Attorney General Willard explained that the government's opposition to the bills in question was based primarily on two deficiencies. First, "it permits the shifting of tort liability from a negligent contractor, or subcontractor, to the Government." *Government Contractors' Product Liability and Indemnification Acts: Hearings on H.R. 4083 and H.R. 4199 Before the Subcomm. on Administrative*

C. The Military Contractor Defense Was Properly Applied In This Case

There is no dispute that the court of appeals properly concluded that the Navy approved reasonably detailed specifications for the CH-53 and no contention that respondent failed to follow those specifications. As the court noted (Pet. App. A6), there were extensive back-and-forth discussions between the Navy and respondent concerning the design of the helicopter. Moreover, as the court emphasized (*ibid.*), the Navy reviewed a mock-up of the cockpit design which included the collective stick

Law and Government Relations of the House Comm. on the Judiciary, 98th Cong., 2d Sess. 49 (1984) [hereinafter 1984 Hearings]. Second, the bills in question provided "no indemnification if the supplier designed or participated in designing the specifications for a product," which "creates a very powerful incentive for the contractor to say hands off, I won't give you the benefit of my expertise in designing your fighter plane" (*id.* at 50).

The government continues to adhere to those views. It opposes removing liability from contractors that fail to warn the government of hazards known to them but not to the government, and certainly opposes shifting liability to the government in such situations. The government also opposes rules that provide incentives for contractors not to work closely with the military in designing weapons systems, and opposes the *Shaw* test in part for that reason. See also *Indemnification of Government Contractors: Hearing on S. 1254 Before the Senate Comm. on the Judiciary, 99th Cong. 1st Sess. 18-34 (1985).*

Amicus Shaw wrongly suggests (Br. 20, 29) that Mr. Willard expressed reservations about the *McKay* test at the 1984 hearings. Minority counsel (inaccurately) described *McKay* as a decision that would provide a disincentive to contractors to work closely with the government (1984 *Hearings* 75-76). Mr. Willard responded, without mentioning *McKay*, that the government had "expressed in litigation serious reservations about some forms of the Government contractor defense" because they "can drive a wedge between what ought to be a cooperative effort between the Government and its contractors in developing specifications" (1984 *Hearings* 76). The government continues to oppose formulations of the military contractor defense (like the *Shaw* test) that discourage contractors from working closely with the government.

and the escape hatch. Thus, the Navy approved the design decisions alleged to have been defective.

The evidence also clearly showed that the Navy did not breach a duty to warn. To the extent that the design of the CH-53's egress system can be considered defective,²² the Navy was clearly aware of its hazards. Given the patent nature of the alleged defects, respondent had no duty to warn the Navy, a sophisticated purchaser of helicopters, of such matters.

As the pictures of the collective stick and the escape hatch handle plainly show (J.A. 580-581), the location of the collective stick requires that the co-pilot carefully reach for the handle when the collective stick is closest to the handle. However, as the pictures also show, it is not particularly difficult to reach the handle even when the collective stick is closest to it. Moreover, it seems plain that it is hard to place anything in the cockpit of an aircraft within reach of the co-pilot without also placing it near something else. Especially in light of the fact that the Navy reviewed a mock-up of the cockpit before approving the design specifications, finding respondent liable based on its failure to warn the Navy of the hazards posed by the location of the collective stick in relation to the escape hatch handle can be accomplished only by assuming that Navy employees are unable to understand the obvious.²³

²² Petitioner states (Br. 20) that the jury found the design of the egress system defective and that respondent failed to warn the Navy of that defect. There is no way to know whether that is true. The jury's general verdict may have been based on its conclusion that respondent introduced the metal chip into the helicopter's machinery when it serviced it.

²³ In addition, the Navy had more than 15 years' experience with the CH-53 before the crash at issue (and 13 years' experience with the helicopter involved in the crash). It was therefore certainly aware of any problems posed by the location of the collective stick, but had not taken any action to make the handle easier to reach. See *Dowd v. Textron, Inc.*, 792 F.2d 409, 412 (4th Cir. 1986). Moreover, the Navy added a device to the top of the

Petitioner also alleges that the egress system was defectively designed because the window opened outward instead of inward, making it more difficult to open the window under water. As an initial matter, that does not seem like a design defect at all. Common sense suggests that an escape hatch that opened inward would be a dangerous design because it would likely strike someone during the emergency that required use of the escape hatch. Moreover, Navy specifications required escape hatches to open outward.²⁴ Accordingly, that design decision hardly seems to have been respondent's. In any event, the Navy was clearly aware that the windows opened outward, was surely aware that a helicopter designed to carry troops and cargo from aircraft carriers to beaches might land in water, and approved the design. In short, the court of appeals properly dismissed petitioner's argument by stating that "nothing in the record * * * indicates there were any hazards of which Sikorsky was aware and the Navy was not" (Pet. App. A6).

Petitioner assumes (Br. 38-39) that the court meant by that statement that neither respondent nor the Navy was aware of the alleged defects in the design of the CH-53's egress system, and argues that the *McKay* version of the military contractor defense unreasonably permits a contractor to "hide behind ignorance." But the question whether a contractor should be liable for a defect not known to the contractor or the military is not a question that is presented here. Both respondent and

collective stick on CH-53s before the accident here to divert heat seeking missiles. J.A. 424-428. Accordingly, the Navy was clearly aware of its location in relation to the escape hatch handle.

²⁴ The Navy's 1959 specifications governing the design of helicopters stated that "[a]ll hatches, doors, windows, or ports, which are to be used as emergency escape exits, shall be quick opening, easily operable, and shall be jettisonable" (J.A. 492). It seems clear that a window has to open outward to be jettisonable, since "jettison" means "act of casting overboard" (*The American College Dictionary* 656 (1970) (emphasis added)).

the Navy were aware of the cockpit design of the CH-53, and the hazards alleged by petitioner to be design defects were patent. Under those circumstances, the contractor clearly cannot be liable for failing to warn of an alleged defect. See "*Agent Orange*," 597 F. Supp. at 850.²⁵

While petitioner does not spell out why he prefers the *Shaw* version of the military contractor test (see Br. 40), it appears that that test might impose liability here because no suitably explicit warning was made. As noted, the Eleventh Circuit in that case required an explicit warning that was appropriate in light of the military's level of expertise—which the court considered to be roughly equivalent to that of an ordinary consumer—and an unequivocal waiver in response to the warning. Thus, it seems that that court would conclude that after showing the Navy detailed design specifications and the mock-up of the CH-53's cockpit, respondent should have stated in writing that it was conceivable that, because the collective stick was near the co-pilot's escape hatch handle, a co-pilot might have some difficulty reaching it. In addition, the *Shaw* court would presumably require that respondent show that it told the Navy that, because the window opened outward, it would be more difficult to open under water than a window that opened inward. And, under the Eleventh Circuit's approach, respondent must then have obtained an explicit statement showing that the Navy understood the problems and nevertheless approved of the design.

Such requirements illustrate the impracticality of that version of the test. If every potential and patent hazard

²⁵ Even if it were assumed that the Navy was not aware of the design specifications that petitioner alleges are defects, respondent should still not be charged with a duty to warn. As the courts of appeals other than the Eleventh Circuit in *Shaw* have concluded, military contractors should not be required to warn of hazards in the absence of evidence that the contractor knew more about the design alleged to be defective than did the military. Here, as the court of appeals concluded (Pet. App. A6), there was no evidence to that effect.

must be treated in such a manner, or contractors face liability, they would have a significant incentive to bury the military in an avalanche of disclosure forms that would get in the way of designing effective weapons systems that are as safe as possible in light of their purposes.

CONCLUSION

The judgment of the court of appeals should be affirmed.

Respectfully submitted.

CHARLES FRIED

Solicitor General

RICHARD K. WILLARD

Assistant Attorney General

DONALD B. AYER

Deputy Solicitor General

JAMES M. SPEARS

ROBERT L. WILLMORE

Deputy Assistant Attorneys General

CHRISTOPHER J. WRIGHT

Assistant to the Solicitor General

ROBERT S. GREENSPAN

Attorney

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AMICUS CURIAE

BRIEF

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No. 86-492

3

IN THE
Supreme Court of the United States

October Term, 1986

DELBERT BOYLE, personal representative of the Heirs and
Estate of David A. Boyle, deceased,

Petitioner,

v.

UNITED TECHNOLOGIES CORP.,

Respondent.

**MOTION FOR LEAVE TO FILE BRIEF *AMICUS CURIAE*
AND BRIEF *AMICUS CURIAE* ON BEHALF OF JOAN S.
TOZER, KATHERINE S. TOZER AND LINDSAY M. TOZER**

MICHAEL J. PANGIA,*
WILTON J. SMITH,
SMILEY, OLSON, GILMAN & PANGIA
Suite 600
1815 H Street, N.W.
Washington, D.C. 20006
(202) 466-5100

**Counsel of Record*

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**MOTION FOR LEAVE TO FILE BRIEF *AMICUS CURIAE*
ON BEHALF OF JOAN S. TOZER, KATHERINE S. TOZER
AND LINDSAY M. TOZER**

Joan Tozer, *et al.*, respectfully move for leave to file the accompanying brief *amicus curiae* in this case pursuant to Rule 36 of the Rules of this Court. The consent of the petitioner has been obtained. Consent of the respondents has not been obtained.

Joan Tozer, *et al.*, are presently before this Court in a related action which is pending (*Joan M. Tozer, et al. v. Ling Temco Vought*, Pet. No. 86-674). The movants are directly interested in this case because determinations made by this Court on the issue of the government contractor defense will have a crucial impact upon their own case.

This brief will be limited to the basic issue of whether a cause of action in tort should be effectively eliminated in the government contractor defense as applied by the Fourth Circuit in *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986), which was followed by the instant case. The Fourth Circuit based its holding on a presumption that the separation of powers doctrine disables a court to find negligence on the part of a government contractor who sold equipment to the military.

This brief presents testimony given to Congress by the Departments of Justice and Defense which we believe may not be presented in other briefs. This testimony addressed the importance of maintaining the tort system as to government contractors.

Wherefore movants respectfully request that their motion for leave to file the annexed brief *amicus curiae* be granted.

Respectfully submitted,

MICHAEL J. PANGIA*
 WILTON J. SMITH
 SMILEY, OLSON, GILMAN & PANGIA
 Suite 600
 1815 H Street, N.W.
 Washington, D.C. 20006
 (202) 466-5100

**Counsel of Record*

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BRIEF OF AMICUS CURIAE
JOAN S. TOZER, ET AL.

This brief *amicus curiae* on behalf of Joan M. Tozer, *et al.*, is filed contingent upon the Court's granting the foregoing motion for leave to file a brief *amicus curiae*.

INTEREST OF THE AMICUS CURIAE

The interest of Joan M. Tozer, *et al.* is set forth in her foregoing motion for leave to file a brief *amicus curiae*.

STATEMENT

ANY APPLICATION OF THE GOVERNMENT CONTRACTOR DEFENSE THAT SHIELDS A MANUFACTURER FROM THE CONSEQUENCES OF ITS NEGLIGENCE IS CONTRARY TO COMMON LAW AND SHOULD BE REJECTED.

The fundamental jurisprudence of tort law as it has developed in the common law of this society holds that a person is held responsible for his negligent acts if that person is found to have had a duty of due care to others and breached that duty. Within

the realm of our society, this weighing of duty, breach, harmful effect and atonement has evolved from a simple premise about human nature: that one who is not accountable for his actions has no motive to consider others in the conduct of his affairs. Because of this premise, our society imposes accountability, a duty of due care which can reasonably be expected of an individual in whatever circumstances he may be found. The existence of a duty embodies latitude to act or not act in a certain manner. See generally, O. Holmes, *The Common Law* 115-129, 173-174 (M. Howe ed. 1963). The arguments advanced in favor of the preclusion of factual inquiry in the government contractor defense immunizes manufacturers from consequences of their negligence in contradiction to the traditional concept that one is responsible for his own acts.

It is submitted that imposing tort liability serves several purposes, among which are: (1) to provide compensation to parties injured by breaches of duty, and (2) to serve as a deterrence to future breaches of duty. The importance of this tort concept has been recently articulated on behalf of the United States by Richard K. Willard, Assistant Attorney General, Department of Justice, opposing a Bill which would provide government indemnification for its contractors as a means of protecting them against tort liability. Mr. Willard states:

Shifting tort liability from the person directly responsible for injuries undermines the function of tort liability as a means of causing a person to act with due care. Proponents of these bills have not shown that it is advisable to abrogate existing financial incentives for complying with the duties which the law has developed.

Government Contractor's Product Liability and Indemnification Acts, 1977: Hearings on H.R. 4083 and H.R. 4199 Before the Subcomm. on Administrative Law and Governmental Relations of the House Comm. on the Judiciary, 98th Cong., 2d Sess. 62 (1984)

Fault is not some archaic vestige of tort law to be jettisoned whenever it stands in the way of compensation. Ultimately, it is the only reliable vehicle in tort law for

distinguishing socially beneficial, from socially harmful, conduct and activities. Without fault in tort law, we deter and punish those who do good—those who are engaged in activities that benefit society. Fault represents the law's judgment that where certain activities benefit society as a whole, the law should not operate to inhibit those activities.

Government Contractor's Product Liability and Indemnification Acts, 1977: Hearings on S. 1254 Before the Comm. on the Judiciary, 99th Cong., 1st Sess. 23 (1985) (Statement of Richard K. Willard, Acting Assistant Attorney General, Dept. of Justice).

While we recognize that the changes in the tort system have created problems for contractors, we do not believe that indemnification is an appropriate response, and certainly it does not correct the underlying reasons for these problems. Indemnification by the government might well, in the short run, solve the problems faced by government contractors in the new world of tort liability; however, it will not solve the systemic problems in the long run and, indeed, may worsen those problems.

Id. at 25.

Furthermore, indemnification removes the safety incentive created by the tort system. To the extent liability can be passed to the government, neither the contractors nor the insurers have a financial interest in ensuring that a product is designed and made with the safety of the user in mind.

Id. at 26.

In considering whether to relieve government contractors from the consequences of their negligence, the Department of Justice stated further:

We think this is bad policy and is inconsistent with the fundamental theoretical underpinnings of tort law, that is, that the prospect of liability allows for a risk avoidance to be taken by the party that bears the liability; and that a contractor is in a better position to prevent negligence or to prevent misconduct by its employees than the Government is. Therefore, the imposition of liability on the contractor

for its own negligence gives the contractor a more powerful incentive to avoid that negligence.

For that reason it is a fundamental principle of tort law that liability is generally based upon fault and is not shifted to parties that are not at fault.

Government Contractor's Product Liability and Indemnification Acts, 1977: Hearings on H.R. 4083 and H.R. 4199 Before the Subcomm. on Administrative Law and Governmental Relations of the House Comm. on the Judiciary, 98th Cong., 2d Sess. 50 (1984) (Statement of Richard K. Willard, Acting Assistant Attorney General, Dept. of Justice).

The Department of Defense also recognizes the need of maintaining the common law concepts of tort accountability imposed upon government contractors. Mary Ann Gilleece, Deputy Under Secretary of Defense for Acquisition Management, Office of the Under Secretary of Defense, testified as follows:

We are concerned that blanket indemnification may reduce the contractor's incentive to assume responsibility for the performance of their products by shifting part or all of the liability onto the government. We prefer to contract in an environment similar to the commercial marketplace where companies must take all the steps that would be required by a prudent businessman in order to ensure the safety of the company's product.

Government Contractor's Product Liability and Indemnification Acts, 1977: Hearings on S. 1254 Before the Comm. on the Judiciary, 99th Cong., 1st Sess. 30 (1985)

In *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986), petition for cert. pending, (Pet. No. 86-674), followed in both *Dowd v. Textron*, 792 F.2d 409 (4th Cir. 1986), petition for cert. pending, (Pet. No. 86-379) and *Boyle v. United Technologies Corp.* presently before the Court, the jury, after hearing all of the manufacturer's evidence on the government contractor defense, found as a net result the existence of a duty and a breach thereof on the part of the manufacturer. Essentially, after hearing the evidence, the jury was convinced that it was the manufacturer and not a military decision which was responsible for negligent design, notwithstanding the fact of a government "approval" of "reasonably

precise" specifications. The manufacturer simply did not put enough fasteners on the forward edge of a panel on the aircraft. The manufacturer, not the government, conceived and drew up the design. Acceptance by the government was based upon the manufacturer's expertise and representations. No command decision was involved. As pointed out by the Justice Department and the Department of Defense, there is no justifiable rationale or social purpose in immunizing the manufacturer from the traditional concepts of accountability provided by our tort system in such cases.

It is submitted that where a military decision is actually present the manufacturer may not have sufficient latitude to have imposed upon it the duty of due care. The issue devolves upon the degree of latitude the manufacturer had, not necessarily upon the reason for the government's decision. However, to reach a conclusion of the existence of no duty on the part of a manufacturer merely because of the existence of "reasonably precise specifications" and government "approval" overlooks the limited import of these terms commonly used in procurement transactions. As stated in an authoritative text:

Nearly every procurement begins with an attempt by Government officials to identify their agency's basic needs and to formulate a description of work to be required under a contract which will satisfy those needs. This description of desired performance may be included in drawings, technical documents, product descriptions and other technical conditions ... collectively referred to as the "specifications."

J. Cibinic, Jr. and R. C. Nash, Jr., *Formation of Government Contracts* 188 (1982)

Specifications fall into three general categories: design, performance and functional specifications, all of which must be reasonably precise and require an "approval" before the particular product is purchased. See, e.g., J. Cibinic, Jr. and R.C. Nash, Jr., *Formation of Government Contracts* 189-215 (1982).

In *Tozer*, the defendant never pleaded the government contractor defense as an affirmative defense and the plaintiffs did not have an opportunity for discovery on the subject. The decision of

the Fourth Circuit, however, presumed that the existence of "reasonably precise specifications" "approved" by the government was a sufficient defense without any further factual inquiry. The approach of the Fourth Circuit unjustifiably relieves the manufacturers of a duty regardless of what the jury found. The Fourth Circuit relies upon its *Tozer* decision in the instant case.

The existence of an "approval" of "reasonably precise specifications" should not be sufficient to immunize manufacturers from liability for negligence. The Department of Justice, by its testimony to Congress, points out that the existence of approved specifications is not tantamount to a command decision which would, in itself, relieve the manufacturer from the consequences of its negligence. Mr. Willard states:

Proponents of the bills [for manufacturers' protection from liability] have argued that the government should indemnify suppliers since the government specifies the design of the supplies it purchases. This is nonsense. The argument assumes that the government actually designs and controls the manufacture of sophisticated products or services to a much larger extent than government can or should do. Private enterprise is far better equipped than government to design and produce sophisticated technology and equipment. The modern military establishment requires and deserves no less than the unfettered commitment of all its suppliers' energies to the end of conceiving and producing the best products and technology. Government personnel need to work with contractors to the fullest extent possible to realize these ends.

Government Contractor's Product Liability and Indemnification Acts, 1977: Hearings on H.R. 4083 and H.R. 4199 Before the Subcomm. on Administrative Law and Governmental Relations of the House Comm. on the Judiciary, 98th Cong., 2d Sess. 63-64 (1984) (Statement of Richard K. Willard, Acting Assistant Attorney General, Dept. of Justice).

Mr. Willard illustrates the point as follows:

Some of the earlier testimony seems to represent what I think is an unrealistic picture of the way specifications are developed for Government contracts, particularly in high

technology areas. The F18 was not designed in great detail by a gnome in the Pentagon with the blueprints then handed out to see whatever contractor wanted to bid on them. Many of these sophisticated procurement matters are primarily, if not entirely, a result of designs developed by contractors, not by Government employees, and that is the way it should be. The government does not have the expertise to go around developing many sophisticated high technology matters; we have to rely on the expertise of the private sector. That has been a great benefit to our country.

Id. at 50.

The proffered rationale that the government contractor defense, in extending tort immunity to contractors, encourages their close working relationship with the government is contrary to the logical objectives of the tort system. There is no justifiable reason advanced for the proposition that any responsible person will seek to avoid accountability because of the presence of a system which enforces that accountability. In fact, the Department of Justice points out that accepting such rationale to provide a government contractor with tort protection would have the opposite result. Mr. Willard states:

Yet, if these bills [to immunize a contractor from the consequences of negligence] are enacted, contractors will have an economic incentive to avoid close working relationships with government personnel. As a result, the specifications and designs of major systems and products frequently would be produced without essential information or expertise. Every economic incentive should be used to encourage design and production of the best and safest products. Proposals to do away with the normal economic incentives—including incentives to avoid personal injury liability which are at the heart of the tort system—run counter to every advantage gained from a free enterprise system. We should work to maximize these advantages, rather than do away with the economic incentives.

Id. at 64.

The Department of Justice rejects another reason advanced by government contractors in their effort to avoid liability for their wrongdoing. Mr. Willard states:

Lastly, some argue that government contractors need relief from liability or a right to indemnification in the event of major disasters generating enormous claims. Where the potential for such catastrophic losses exists, Congress has enacted special legislation authorizing indemnification of contractors in limited situations, and upon a substantial showing of need. See, for example, 10 U.S.C. 2354 (military research and development), 50 U.S.C. 1431-1435 (P.L. 85-804) and 41 U.S.C. 2210 (Price-Anderson Act). These statutes, in our view, cover most of the situations where catastrophic coverage may be needed, including defense and space activities. This authority has been exercised through Executive Order 10789, which authorizes, with exceptions, indemnification for certain contracts where the risks are "unusually hazardous or nuclear in nature." We feel Congress should continue this careful case by case review of such proposals to identify the need for indemnification and to carefully weigh the costs to the government. Blanket proposals for contractor indemnification are unwise and unnecessary.

Government Contractor's Product Liability and Indemnification Acts, 1977: Hearings on H.R. 4083 and H.R. 4199 Before the Subcomm. on Administrative Law and Governmental Relations of the House Comm. on the Judiciary, 98th Cong., 2d Sess. 59-60 (1984) (Statement of Richard K. Willard, Acting Assistant Attorney General, Dept. of Justice).

In summary, the reasons that have been proffered by those who oppose the imposition of tort liability upon government contractors do not overcome the basic reasons for the existence of tort liability within our system of common law. It is submitted that the thoughts and reasons put forth by the Departments of Justice and Defense conclusively support the retention of the tort system in the context of military procurement and that determination of the existence of a duty on the part of manufacturers need not invade command decisions made in the military context. Thus,

the position of the Fourth Circuit which overrides a jury's finding of negligence is a position which, without sufficient justification, abrogates a common law right of action in tort.

CONCLUSION

The decisions of the Fourth Circuit in *Tozer* and *Boyle* overruling the the jury verdicts of negligence should be reversed.

Respectfully submitted,

MICHAEL J. PANGIA*
WILTON J. SMITH
SMILEY, OLSON, GILMAN & PANGIA
Suite 600
1815 H Street, N.W.
Washington, D.C. 20006
(202) 466-5100

**Counsel of Record*

AMICUS CURIAE

BRIEF

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JOSEPH F. SPANIOLO, JR.
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UNITED TECHNOLOGIES CORPORATION,
Respondent.

**BRIEF OF AMICUS CURIAE
ASSOCIATION OF TRIAL LAWYERS OF AMERICA
IN SUPPORT OF PETITIONER**

Robert L. Habush, President
The Association Of Trial Lawyers of America
777 East Wisconsin Avenue, Suite 2200
Milwaukee, WI 53202

Dale Haralson
Counsel of Record
Denneen L. Peterson
Haralson, Kinerk & Morey, P.C.
82 South Stone Avenue
Tucson, Arizona 85701
(602) 792-4330

*Attorneys for Amicus Curiae
The Association of Trial Lawyers of America*

QUESTION PRESENTED

When the "government contractor defense"
should be available to a supplier of military
equipment.

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No. 86-492

IN THE SUPREME COURT OF THE UNITED STATES
October Term 1986

DELBERT BOYLE, personal representative of
the Heirs and Estate of David A. Boyle,
deceased,

Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

BRIEF OF AMICUS CURIAE
ASSOCIATION OF TRIAL LAWYERS OF AMERICA
IN SUPPORT OF PETITIONER

STATEMENT OF INTEREST

The Association of Trial Lawyers of America is a voluntary, nationwide organization of over 70,000 members, including several hundred in Canada and other foreign countries. Its membership includes judges and law teachers, but primarily consists of

lawyers who specialize in litigation, and particularly in the representation of plaintiffs in civil cases involving injuries and death to people and damaged property.

The men and women of the Association are pledged to the preservation of the American legal system, the protection of individual rights and liberties, and the evolution of the common law. Through its appropriate officers and committees, the Association has authorized participation in this case as Amicus Curiae. This Brief is filed with the written consent of all the parties.

The Association is concerned with this action because the decision in this case will have an immediate effect on similar cases that may now be pending throughout the country as well as on the development of legal doctrine. The Association files this Brief in support of Petitioner's position that the government contractor defense

should only be available if the contractor has taken appropriate action to protect the product user.

SUMMARY OF ARGUMENT

Fundamental principles of tort law require that consumers be protected from defective products by holding manufacturers liable for injuries caused by those products. However, there have been instances of exceptions to this rule when the reasons for imposition of liability for injuries caused by military products to military personnel are in some exceptional cases overruled by the public policy reasons which justify the government contractor defense.

The appropriate test is that the contractor did not participate, or participated only minimally, in the design of those products or parts of products shown to be defective; or that it timely warned

the military of the risks of the design of the defective products; and notified it of alternative designs reasonably known by the contractor; and that the military, although forewarned, clearly authorized the contractor to proceed with the dangerous design. "Reasonable knowledge" means that the manufacturer is presumed to know of the defects in the things he makes, whether or not he has actual knowledge of them.

The tests for the government contractor defense set forth in McKay v. Rockwell International Corporation, 704 F.2d 444 (9th Cir. 1983), cert. denied, 464 U.S. 1043, 104 S.Ct. 711, 79 L.Ed.2d 175 (1984), and in In re Agent Orange Product Liability Litigation, 534 F.Supp. 1046 (E.D.N.Y. 1982), are flawed. The policy reasons cited in support of these tests are not applicable and the knowledge element of these tests actually encourages manufacturers to know as

little as possible about their products.

The Fourth Circuit's decision in Shaw v. Grumman Aerospace Corporation, 778 F.2d 736 (11th Cir. 1985), cert. pending solves much of the problems with the McKay and Agent Orange tests. Thus, the appropriate test is that set forth in Shaw with modifications as to the knowledge element of the test.

ARGUMENT

THE "GOVERNMENT CONTRACTOR DEFENSE" SHOULD ONLY BE AVAILABLE IF THE CONTRACTOR HAS TAKEN APPROPRIATE ACTION TO PROTECT THE PRODUCT USER.

Fundamental principles of tort law require that consumers be protected from defective products by holding manufacturers liable for injuries caused by those products. However, there have been instances of exceptions to this rule when the reasons for imposition of liability for injuries caused by military products to military personnel are in some exceptional

cases overruled by the public policy reasons which justify the government contractor defense. Amicus Curiae Association of Trial Lawyers of America (ATLA) submits that the appropriate test is as follows:

(1) That the contractor did not participate, or participated only minimally, in the design of those products or parts of products shown to be defective; or

(2) That it timely warned the military of the risks of the design of the defective products; and

(3) Notified it of alternative designs reasonably known by the contractor; and

(4) That the military, although forewarned, clearly authorized the contractor to proceed with the dangerous design.

(5) "Reasonable knowledge" means that the manufacturer is held to the knowledge and skill of an expert with regard to its product and a manufacturer is presumed to know of the defects in the things he makes, whether or not he has actual knowledge of them.

This test is that set forth in Shaw v. Grumman Aerospace Corporation, 778 F.2d 736 (11th Cir. 1985), cert. pending, with one modification as to the knowledge portion of the test. Amicus Curiae ATLA submits that the "reasonable knowledge" required of a contractor should include the Borel v. Fibreboard Paper Products Corp., 493 F.2d 1076 (5th Cir. 1973), cert. denied, 419 U.S. 869, 95 S.Ct. 127, 42 L.Ed. 107 (1974), rule concerning a manufacturer's knowledge of dangers associated with the use of its product.

A. Imposition of Liability For Injuries To Military Personnel Caused By Military Products Is Appropriate.

The purpose of strict liability is to insure that the costs of injuries resulting from defective products are borne by the manufacturers that put such products on the market rather than by the injured persons

who are powerless to protect themselves. Challoner v. Day and Zimmermann, Inc., 512 F.2d 77, 84 (5th Cir. 1975), vacated on other grounds sub nom., Day & Zimmermann v. Challoner, 423 U.S. 3, 96 S.Ct. 167, 46 L.Ed.2d 3 (1975). Fundamental principles of tort law dictate that private parties should compensate the victims of injuries they cause. Note, The Government Contract Defense: Should Manufacturer Discretion Preclude Its Availability?, 37 Me.L.Rev. 187, 208 (1985). This principle is at the core of the theory of strict liability. Id., n. 94. As early as 1881, the following rationale was expressed for holding manufacturers strictly liable for defective products: "'The safest way to assure care is to throw the risk upon the person who decides what precautions will be taken.'" Note, McKay v. Rockwell International Corp.: No Compulsion Required

for Government Contractor Defense, 28 St. Louis U. L.Rev. 1061, 1062 (1984), quoting from W. Kimble and R. Lesher, Products Liability §20 (1979) (quoting Holmes, The Common Law 117 (1881)). The first application of the strict liability theory for recovery in a product liability action was by Justice Traynor in Greenman v. Yuba Power Products, Inc., 59 Cal.2d 57, 377 P.2d 897, 27 Cal.Rptr. 697 (1962), where he expressed two fundamental reasons for holding manufacturers liable in product cases: To insure that manufacturers, rather than plaintiffs, bear the costs of injuries caused by defective products, and to enforce the manufacturers' inherent representation, made by placing goods on the market, that those goods are safe for their intended use. Id., 59 Cal.2d at 63, 377 P.2d at 901, 27 Cal.Rptr. at 701. The next strict liability rule was that adopted in the

Restatement (Second) of Torts, §402A. The goal of strict liability is justified because those injured by defective products are powerless to protect themselves. Note, Liability of a Manufacturer for Products Defectively Designed by the Government, 23 B.C.L.Rev. 1025, 1041 (1982). Challoner stated that this policy extends to protecting members of the armed forces as well as the general public. Id. Public interest in health and safety requires manufacturers to bear the responsibility for any harm caused by defects in the products they sell to a consumer. Id., at 1083.

B. The Government Contractor Defense Should Only Be Available Where The Contractor Has Taken Appropriate Steps to Protect the Product User.

Under very limited circumstances a contractor working for the Government may be protected from suit because of the government contractor defense. Amicus Curiae ATLA submits that the proper test is

Shaw v. Grumman Aerospace Corporation, 778 F.2d 736 (11th Cir. 1985), cert. pending, with modifications. Shaw's test holds that, as a general rule, the military contractor will be liable, as is any other contractor, to servicemen injured by defects (i.e., unreasonable dangerousness) in the products, or portions or phases of products, that it designs. Id., at 745. A contractor may escape liability only if it affirmatively proves: (1) that it did not participate, or participated only minimally, in the design of those products or parts of products shown to be defective; or (2) that it timely warned the military of the risks of the design and notified it of alternative designs reasonably known by the contractor, and that the military, although forewarned, clearly authorized the contractor to proceed with the dangerous design. Id., at 746.

Element one of this test is fashioned to

allow a military contractor to show, when it actually works jointly with military personnel in producing product specifications, that the part it played was so minimal as to excuse it from proving the second part of the test. Id. This determination is appropriately made by the trial judge. Id. Shaw requires the contractor to show that it did not prepare the specs, and the government's participation, if sufficiently great, may prove the defense. Id.

If element one of this defense is not proved by a preponderance of the evidence, then element two first requires a demonstration that the contractor both warned the military of the specific risks of the product or product part that it designed and informed it of design alternatives "reasonably known" to the contractor. Id. Shaw requires modification where it allows that a risk is reasonably known when it is

either actually known, or reasonably ought to be known given good design practices in the industry. Id. Similarly, an alternative is reasonably known if it is either actually known, or reasonably ought to be known given good design practices in the industry. Id. Amicus Curiae ATLA submits that the appropriate test here regarding knowledge is that set forth in Borel v. Fibreboard Paper Products Corp., 493 F.2d 1076, 1089 (5th Cir. 1973), cert. denied, 419 U.S. 869, 95 S.Ct. 127, 42 L.Ed. 107 (1974): the manufacturer is held to the knowledge and skill of an expert. Similarly, the design practices of the industry should not be the standard because the entire industry may be unduly lagging in the adoption of new and available devices. The T.J. Hooper, 60 F.2d 737 (2d Cir. 1932) There are precautions so imperative that even their universal disregard will not

excuse their omission. Id. Shaw would reward "ostrich" (head-in-the-sand) conduct by a manufacturer. The lack of knowledge, lack of research, and lack of testing that would disclose the danger of a product should not be rewarded with immunity. Nor should failure to implement available, but generally disregarded, devices be rewarded with immunity. Whether the contractor's counsel on these matters is sufficiently specific and complete to permit an informed decision regarding the specific defect complained of on the part of the military is a matter of fact. Shaw. In making this assessment of sufficiency, the Court may take into account evidence that goes to the military's own level of relevant knowledge and expertise. Id.

Element two further requires a showing by the contractor that the military, although forewarned, clearly authorized the

contractor to proceed with the dangerous design. Id. Authorization here must be knowing. Id. It must also be clear--that is, obviously related and responsive to the relevant warning. Id.

The overriding objective of this test is to determine whether a military judgment to go ahead with the dangerous design which caused the injury was actually made. If so, the contractor that created or helped create the design is absolved from judicially-imposed liability. Id. If not, then the contractor is subject to the customary strictures of product liability law. Id.

Respondent United Technologies Corporation will probably claim that this Court should adopt the test in McKay v. Rockwell International Corporation, 704 F.2d 444 (9th Cir. 1983), cert. denied, 464 U.S. 1043, 104 S.Ct. 711, 79 L.Ed.2d 175 (1984), or the test in In re Agent Orange Product

Liability Litigation, 534 F.Supp. 1046

(E.D.N.Y. 1982). The McKay test is as follows:

"[A] supplier of military equipment is not subject to section 402A liability for a design defect where: (1) the United States is immune from liability under Feres and Stencel, (2) the supplier proves that the United States established or approved, reasonably precise specifications for the allegedly defective military equipment, (3) the equipment conformed to those specifications, and (4) the supplier warned the United States about patent errors in the government's specifications or about dangers involved in the use of the equipment that were known to the supplier but not to the United States. The imposition of this duty to warn of known defects is necessary to enable the United States to balance the risks and benefits inherent in the use of the equipment."

Id., at 451. The Agent Orange test provides:

(1) that the Government established the specifications for the product; (2) that the product manufactured by the contractor met the Government's specifications in all material respects; and (3) that the Government knew as much

as or more than the defendant about the hazards to people that accompanied use of the product.

Id., at 1055. There are several problems with the McKay and Agent Orange tests in particular and the government contractor defense in general.

1. The Feres-Stencel Doctrine Is No Longer Controlling.

The United States is not subject to liability under the Federal Tort Claims Act, 28 U.S.C. §2674, to a member of the armed forces who sustains an injury while on active duty. Feres v. United States, 340 U.S. 135, 71 S.Ct. 153, 95 L.Ed. 152 (1950). The Federal Tort Claims Act precludes the United States from indemnifying a third party for damages paid by it to a member of the armed forces who is injured during military service. Stencel Aero Engineering Corp. v. United States, 431 U.S. 666, 674, 97 S.Ct. 2054, 2059, 52 L.Ed.2d 665, 672 (1977). The McKay court held that the

reasons for applying the government contractor defense to suppliers of military equipment with design defects approved by the government paralleled those supporting the Feres-Stencel doctrine. Id., at 449. However, this is based on a strained reading of Stencel and an outdated interpretation of Feres. Shaw v. Grumman Aerospace Corporation, 778 F.2d 736, 742 (11th Cir. 1985), cert. pending. The limitation of government liability rationale behind the Feres-Stencel doctrine appears to be no longer controlling since United States v. Shearer, 473 U.S. 52, 105 S.Ct. 3039, 3043, n. 4, 87 L.Ed.2d 38 (1985), where the court based its decision of non-liability on the fact that Feres is best explained by the peculiar and special relationship of the soldier to his superiors.

Neither Feres nor Stencel address,

limit, nor preclude contractor liability to military personnel who are injured while using defectively designed and unsafe equipment. McKay, at 456 (Alarcon, J., dissenting). The Feres-Stencel doctrine is concerned exclusively with government, not contractor, liability. Id. As stated in In re Agent Orange Product Liability Litigation, 506 F.Supp. 762, 772 (E.D.N.Y. 1980), rehearing denied, 534 F.Supp. 1046 (E.D.N.Y. 1982), to the extent that plaintiff's complaints seek recovery against the defendant chemical companies, of course, the Feres doctrine has no application. Id. Where plaintiffs have filed neither a direct claim nor a claim of indemnification against the Government, their claims reside outside the previously defined area of concern expressed in Feres-Stencel and Agent Orange. McKay, at 456 (Alarcon, J., dissenting).

Stencel impliedly recognized that a cause of action against a military contractor is proper. Id., at 457. The Court states in Footnote 8 that prohibiting indemnification of Stencel is not unfair because it no doubt had sufficient notice so as to take this risk of being held liable without indemnification by the government into account in negotiating its contract for the product at issue. Id. This statement implies (1) the Court was aware of Stencel's liability for the product and declined to restrict or preclude it, and (2) the Court recognized that contractors like Stencel are aware of their possible liability in this context and have already set their bid prices to reflect this risk. Id. Here, too, the Court declined to restrict or preclude this practice. Id. Consequently, limiting the risk which supports this added cost merely results in a windfall to

suppliers who have existing contracts.

Id. Even more recently, this Court has at least impliedly held that manufacturers have the responsibility for their unsafe products. United States v. S.A. Empresa de Viacao Aerea Rio Grandense (Varig Airlines), 467 U.S. 797, 816-17, 104 S.Ct. 2755, 2766-67, 81 L.Ed.2d 660, 676 (1984). Further, the Government already contracts for the manufacturer to remain liable. 51 Fed.Reg. 40,977, 40,978 (1986) (to be codified in 53 C.F.R. §5350.401-90(b)). Therefore, the Feres-Stencel doctrine no longer justifies the government contractor defense.

2. The Cost Overruns or Higher Price Rationale Is Not Economically Sound.

The McKay court held that by holding the supplier liable in government contractor cases without regard to the extent of government involvement in fixing the product's design and specifications would subvert the

Feres-Stencel rule since military suppliers, despite the Government's immunity, would pass the cost of accidents on to the United States through cost overrun provisions and equipment contracts, through reflecting the price of liability insurance in the contracts, or through higher prices in later equipment sales. Id., at 449.

However, the Shaw court was not convinced that the cost pass-through rationale is economically sound. Shaw v. Grumman Aerospace Corporation, 778 F.2d 736, 741 (11th Cir. 1985), cert. pending. To the extent that any competition obtains in the market for defense products, for example, contractors with defective designs may be deterred from passing through the cost of liability for defective design by competition from contractors with better safety records. Id., at 741-42, quoting from McKay, 704 F.2d at 457 (Alarcon, J.,

dissenting). Even if there is some transfer of costs, the net price to the Government of contractor liability in these cases might be less without a tort law exception--that is, if legal incentives promote better-designed planes and fewer costly accidents. Shaw, at 742. The loss from the crash of a single A-6 is in the millions of dollars--not to mention the cost in human terms. Id. In these days of \$600 hammers and \$1200 toilet seats, saving human lives through safe product design and manufacture would probably reduce rather than cause cost overrun.

Those manufacturers with proven safety records may be able to secure liability insurance at much lower rates than less careful suppliers. McKay, at 457 (Alarcon, J., dissenting). Presumably, such cost savings enable these manufacturers to make lower bid prices and be more competitive.

Id. The military is free to pursue and accept these lower bids and by doing so they help sharpen competition and keep the overall cost of bids down. Id.

The free market system ensures that any such liability costs which are transferred will be minimized. Id. Just as some manufacturers are better at minimizing the cost of overhead, others will be better at producing safe designs and avoiding liability. Id. Bid price competition and the cost of liability provide incentives to minimize both. Id. Footnote 8 of Stencel concedes this system's existence and recognizes that one way or another, all costs incident to manufacture get passed on to the customer, whether or not it is the Government. Id., at 457-58 (Alarcon, J., dissenting). As long as our economy continues as a free market system, we should not deny its realities. Id., at 458

(Alarcon, J., dissenting).

The belief that, absent the defense, contractors will circumvent governmental immunity by increasing contract prices does not take into consideration the fact that the Government awards most contracts under a bidding system which allows the free market to regulate the price so that contractors with safe records will not have any additional costs to pass on to the Government, and will be able to provide safer products at cheaper prices. Brown v. Caterpillar Tractor Co., 696 F.2d 246, 254 n. 16 (3d Cir. 1982); Note, Schoenborn v. Boeing Co.: The Government Contractor Defense Becomes A "Windfall" for Military Contractors, 40 U.Miami L.Rev. 287, 296 (1985). In 1980, 85-90% of all federal contract dollars were let through negotiated procurement. Note, Schoenborn, Id., n. 49. Also see, Federal Procurement Data System,

Standard Report, Fiscal Year 1983 First Quarter (1983); J. Paul, United States Government Contracts and Subcontracts 163 (1964). In addition, the threat of increased government contract prices was just as much of a threat when the Stencel court decided to prevent indemnification against the Government. Note, Schoenborn, Id., at 296. Yet, there is no evidence that contract prices rose as a result of Stencel when contractors bore the entire risk of liability. Id. No reason suggests why the situation will be any different if the courts limit the defense to the Shaw test, a modified Shaw test, or even abolish the defense. Id.

If manufacturers are given too much protection from liability, costs as measured in lives and equipment will surely rise. Id., n. 51. In addition, recent studies show that the existence of a government

contractor defense has little effect on manufacturer's insurance rates. Interagency Task Force on Products Liability, U.S. Dept. of Commerce, Final Report of the Insurance Study I-40 (1977). Rates for product liability insurance are based largely on intangible factors instead of actuarial considerations such as size or number of claims. Id., at I-22. These insurance costs amounted to only 2% of the general sales from 1969 to 1973 of the 35 companies which manufactured over 90% of all aviation aircraft, engines, avionics, supplies, and components. Id., at I-21. In most cases, the average cost amounted to less than 1% of the sales. Interagency Task Force on Product Liability, U.S. Dept. of Commerce, Final Report xxxvii (1978).

In the public works context, where the government contractor defense has its beginnings, the defense could not have been

based on a cost-saving rationale because, even though the contractor escaped liability, the Government often remained liable for compensation under the fifth amendment.

Yearsley v. W.A. Ross Construction Co., 309 U.S. 18, 20-21, 60 S.Ct. 413, 414, 84 L.Ed. 554, 557 (1940). The Fourth Circuit, as early as 1923, rejected the argument that a negligent contractor should escape liability in order to protect public coffers.

Thompson Caldwell Const. Co. v. Young, 294 F. 145, 146-47 (4th Cir. 1923). The court stated: "[W]e are not willing to hold that such a possibility or probability [of the public paying higher contract prices] is of sufficient weight to justify so great a negation of individual rights." Id., at 147.

The desire to limit contract costs does not warrant depriving an injured plaintiff of the right to recover against a private

manufacturer for injuries caused by a design defect attributable to that manufacturer.

Note, The Government Contract Defense:

Should Manufacturer Discretion Preclude Its Availability?, 37 Me.L.Rev. 187, 206 (1985).

Any increase in the cost of military equipment borne by the taxpayers will not be significant. Id. One court, commenting on McKay's holding that preventing increased costs requires shielding manufacturers from design liability but not from liability for manufacturing defects, inquired: "On what principled ground, then, could it be justified that the cost of manufacturing defects will be passed along, through higher contract prices to the Government, to all of us who are taxpayers, while the design defect 'tax' will fall only on a few unfortunate, innocent, randomly selected victims?" Johnston v. United States, 568 F.Supp. 351, 357 (D. Kan. 1983).

Military suppliers will rarely be unable to insure against potential liability because most government contracts are procured by bid or negotiation. Note, 37 Me.L.Rev., at 207.

In short, the threat of increased costs is not a sufficient rationale for allowing the government contract defense to protect manufacturers against actions for defective design. Note, Liability Of A Manufacturer For Products Defectively Designed By The Government, 23 B.C.L.Rev. 1025, 1071 (1982).

3. Manufacturer Responsibility For An Unsafe Product Will Not Adversely Affect Military Decisions, Military Discipline, Or National Security.

The McKay court claimed that to hold military suppliers liable for defective designs where the United States set or approved the design specifications would press the judiciary into the making of military decisions. Id., at 449.

According to McKay, trials on design defects where Government specifications are at issue would involve second-guessing military orders and would raise concerns about their effect on military discipline and on national security. Id.

However, with regard to "military discipline" two concerns are actually involved: (1) the notion that a soldier might use the civilian courts to challenge the act or order of a superior officer; and (2) the idea that in a civilian suit of any sort involving a serviceman, members of the military might be compelled to testify against one another to the detriment of discipline. Shaw v. Grumman Aerospace Corporation, 778 F.2d 736, 742, cert. pending. The first quite simply would not justify a military contractor defense since the challenge in these cases is to an independent contractor, not a military

officer. Id., at 742-43. The latter concern is also not present in military contractor suits in the same way as it is under Feres. Id., at 743. The military contractor defense is an affirmative defense that must be pled and proved by defendant in the course of suit. Id. In other words, the plaintiff will in any event be putting on his or her case. Id. Indeed, it may be the raising of the defense by the defendant, rather than the maintenance of the action itself, that makes potentially conflicting military testimony necessary--a point which argues in favor of liability for contractors and against the availability of the defense. Id. The Shaw court found the likelihood of any profound disruption of discipline to be negligible from testimony in suits against military contractors. Id. The danger of interfering with discipline in military contractor cases is

too remote to be accorded significant weight when the decision only indirectly involves military orders or practices concerning active duty soldiers. Id.; Cole v. United States, 755 F.2d 873, 879 (11th Cir. 1985), rehearing denied, 765 F.2d 1123 (11th Cir. 1985).

However, military users of products, especially in the military aviation community, are ordered to report defects in the aircraft which make them unairworthy. If they find a defect which makes the aircraft unworthy, they are ordered by their superiors to not accept the aircraft for flight.

The "military discipline" argument ignores the fact that decisions regarding good design of military equipment which impose liability on the manufacturer under the Shaw test do not involve military judgments. Holding manufacturers liable for

injuries caused by design flaws will not impose any burden on the military's ability to make judgments in fulfillment of its obligation to provide for an adequate defense. Note, The Government Contract Defense: Should Manufacturer Discretion Preclude Its Availability?, 37 Me.L.Rev. 187, 201-02 (1985). In fact, in order for the military to exercise a "military decision," it had to know of the specific defect via information provided by the manufacturer.

While the McKay court and others claim that contractor immunity is essential to the maintenance of national security and that courts should therefore defer to military judgment concerning national defense, this Court will remember this was the same reasoning given in the Japanese internment cases such as Korematsu v. United States, 323 U.S. 214, 65 S.Ct. 193, 89 L.Ed. 194

(1944), rehearing denied, 324 U.S. 885, 65 S.Ct. 674, 89 L.Ed. 1435 (1945). Those cases were seriously criticized as mistakes at the time. Rostow, The Japanese American Cases-- A Disaster, 54 Yale L.J. 489 (1945). It is essential that there be definite limits to military discretion. Korematsu, at 234, 65 S.Ct. at 202, 89 L.Ed. at 208. Individuals must not be left impoverished of their constitutional rights on a plea of military necessity. Id. The military claim must subject itself to the judicial process of having its reasonableness determined and its conflicts with other interests reconciled. Id. What are the allowable limits of military discretion, and whether or not they have been overstepped in a particular case, are judicial questions. Sterling v. Constantin, 287 U.S. 378, 401, 53 S.Ct. 190, 196, 77 L.Ed. 375, 387 (1932); Korematsu, at 234, 65 S.Ct. at

202, 89 L.Ed. at 208 (Marshall, J., dissenting).

As warfare becomes more dangerous, the problem of assuring a sensible choice of war policies, and of preserving democratic social values under conditions of general mobilization, become steadily more urgent. Rostow, at 530. Military necessity is the power to wage war, not a license to do unnecessary and dictatorial things in the name of the war power. Id. When a court confronts the problem of determining the permissible limit of military discretion, it must test the question by the same methods of judicial inquiry it uses in other cases. Id. Military discretion is discretion exercised by the military. Contractors cannot, by definition, exercise military discretion. The concern is with design defects by the private contractor.

Even the Government cannot hide behind a

claim of war powers or national security: "Not unmindful of the vital importance of nuclear experimentation to the welfare and safety of our country, there yet has been established nothing here that would justify the intentional or negligent endangering of lives or property in the course of the tests. To seek to do so would seem to compromise fundamental human rights for the protection of which our governmental policy is designed." Bulloch v. United States, 145 F.Supp. 824 (D. Utah 1956). If this is true of the Government, it is even more true of manufacturers.

While there is a separation of powers between the branches of Government, Shaw, there is also a system of checks and balances which permits the court to scrutinize certain military related situations. Commodity Futures Trading Comm'n. v. Schor, 478 U.S. ___, 106 S.Ct.

3245, 3257, 3262, 92 L.Ed.2d 675, 692, 698 (1986).

4. Suppliers Are Able To Eliminate Risks of Liability.

The McKay court claims that in setting specifications for military equipment, the United States is required by the exigencies of our defense effort to push technology toward its limits and thereby to incur risks beyond those that would be acceptable for ordinary consumer goods, Id., at 449-50, when, in the few cases in which this occurs, a modified Shaw test would protect the manufacturer. As pointed out in Shaw v. Grumman Aerospace Corporation, 778 F.2d 736, 743 (11th Cir. 1985), cert. pending, military risk-taking--where it involves products supplied by contractors--is shielded by judicial scrutiny by the military contractor defense, provided that it is knowing and purposeful on the part of the military with respect to the specific

defect in question. In addition, as explained above, the majority of government contractor dollars goes toward negotiated contracts. Thus, the question of negotiation for liability does not justify the defense.

5. Liability For Unsafe Products Would Create A Greater Incentive For The Supplier To Build Safer Products.

The McKay court claims that a government contractor defense provides incentives for suppliers of military equipment to work closely with and to consult the military authorities in the development and testing of equipment. Id., at 450. Indeed, on the contrary, the Shaw court explained that the more closely the contractor and the military work together, the more difficult it is to determine exactly who made design decisions. Id., at 743.

If the McKay court's assumption is

that close work between the Government and contractor leads to safer products, then the court may have little basis for its claim.

Note, Schoenborn v. Boeing Co.: The Government Contractor Defense Becomes a "Windfall" for Military Contractors, 40

U.Miami L.Rev. 287, 299 (1985). Two parties who face no liability would hardly have more incentive to build safer products than one who does not have such immunity.

Id.

Similarly, in Koutsoubos v. Boeing Vertol, 755 F.2d 352 (3d Cir. 1985), cert. denied, ____ U.S. ____, 106 S.Ct. 72, 88 L.Ed. 59 (1985), where the McKay test was adopted, the court failed to realize that its concern should be on what it is trying to encourage--safe products--not on a close working relationship with the Government, unless a close working relationship is instrumental in obtaining safe products.

Note, Schoenborn, at 299. In Koutsoubos, it was not. Id. The court found that there had been a "back and forth" discussion between the Navy and Boeing about the specifications, yet Boeing still manufactured a defective helicopter and two servicemen died as a result. Id. The concern is to encourage safe equipment. The answer to this concern is liability.

6. Compensation Under The Veterans' Benefits Act Is Not Exclusive.

According to McKay, in the case of injured military personnel, the Veterans' Benefits Act, 38 U.S.C. §§101-5228, provides a generous military compensation scheme and a swift, efficient remedy and the serviceman or his family will not go uncompensated. Id., at 452. Even the McKay majority points out that strict liability would increase that compensation. Id.; Note, Schoenborn v. Boeing Co.: The Government Contractor Defense Becomes a "Windfall" for

Military Contractors, 40 U.Miami L. Rev. 287, 300 n. 70 (1985). Indeed, the Veterans' Benefits Act contains neither an implicit nor an explicit declaration that it is the exclusive remedy against the Government for a serviceman's injury. Stencel Aero Engineering Corp. v. United States, 431 U.S. 666, 675, 97 S.Ct. 2054, 2060, 52 L.Ed.2d 665, 673 (1977) (Marshall, J., dissenting). Under the Act the rates of disability compensation range from \$68 per month to \$2325 per month. 38 U.S.C. §§314, 334, with additional compensation for dependents set forth in 38 U.S.C. §§315 and 335. Death compensation ranges from \$40 per month to \$122 per month (with \$23 for each additional child after three children). 38 U.S.C. §§322, 342. The dependency and indemnity compensation to a surviving spouse (for death after December 31, 1956) ranges from \$491 to \$1255 per

month with increases for children, blindness, or disability. 38 U.S.C. §411.

Thus, since the Act is not intended to be a plaintiff's exclusive remedy and since it may not fully compensate a plaintiff for his losses, he should be allowed to pursue the contractor for tort law compensation for his injuries.

7. Military Personnel Expect That The Equipment They Use Will Be Safe.

Next, the McKay court claims that members of the armed forces have lower reasonable expectations of safety than ordinary consumers:

"They recognized when they joined the armed forces that they may be exposed to grave risks of dangers, such as having to bail out of a disabled aircraft. This is part of the job. The Nation sometimes demands their very lives. This is an immutable feature of their calling. To regard them as ordinary consumers would demean and dishonor the high station in public esteem to which, because of their exposure to danger, they are justly entitled."

Id., at 453. However, "if anything persuades pilots to tremble and the enemy to rejoice, it will be the A-6 aircraft's accident record itself--not any court's recognition of it." Shaw v. Grumman Aerospace Corporation, 778 F.2d 736, 743 n. 12 (11th Cir. 1985), cert. pending. Judge Alarcon took issue with the McKay majority's description of the high honor and esteem in which military personnel are held:

"They are not so respected because they are sometimes forced by their calling to use unsatisfactory or unsafe equipment. It is the Military's, Rockwell's, and this court's duty to insure that our servicemen are provided with reliable and safe equipment. Just as the Military can make any parachute packer take one that he has just folded and make him jump with it, the court should require that Rockwell stand behind the products for which it voluntarily contracts and provides at a profit. To extend the contractor defense in the way the majority suggests will only result in more unsafe and unreliable equipment. To do so would unnecessarily

increase the danger which our military personnel face so patriotically. [Footnote omitted]."

Id., at 461 (Alarcon, J., dissenting). The public interest in human life and health requires the protection of the law against the manufacturer of defective explosives, whether they are to be used by members of the public at large or members of the public serving in our armed forces. Foster v. Day and Zimmermann, Inc., 502 F.2d 867, 871 (8th Cir. 1974). It could never be said as a matter of law that one whose job requires him to expose himself to a danger, voluntarily and unreasonably encounters the same. O'Keefe v. Boeing Company, 335 F.Supp. 1104, 1121 (S.D.N.Y. 1971), quoting from Brown v. Quick Mix Co., 75 Wash.2d 833, 836, 454 P.2d 205, 208 (1969).

Contracting to provide a good or a product to the Government should not create a market onto which manufacturers can dump

defective and dangerous products, unfettered by the liability concerns they face when supplying goods to consumers. Zollers & Hurd, A Model for Analyzing The Government Contract Defense In Product Liability, 9 J. Products Liability 317, 327 (1986).

Servicemen probably did not anticipate being treated as second-class citizens and subjected to defective equipment without a hope of recovering damages for it. Note, Schoenborn v. Boeing Co.: The Government Contractor Defense Becomes A "Windfall" for Military Contractors, 40 U.Miami L.Rev. 287, 300 n. 70 (1985). A soldier anticipates risks associated with war and the enemy, not defective products. Id. By providing contractors with this defense, the courts have condemned society to pay a great price, the kind that is paid with people's lives. Id., at 303. Imagine the billions of dollars lost when a product bought by the

Government is not used because of a defect in the equipment. Billions are lost when trained people are injured by defective products and are placed on compensation. Granting such an expansive immunity to government contractors can only promote reckless conduct, and, although recklessness is dangerous in any sector of society, such behavior is particularly hazardous in the area of military products. Id.

8. The Government Contractor Defense Is Unfair.

Some courts have claimed that it is unfair to place the potential for liability from defectively designed products entirely on the shoulders of the private manufacturer who was acting in compliance with the Government contract. Yearsley v. W.A. Ross Construction Co., 309 U.S. 18, 60 S.Ct. 413, 84 L.Ed. 554 (1940). However, not only does the defense afford an effective means of protection to the blameless private

manufacturer, it also forecloses the only avenue of redress available to an injured party since the ultimate result of a successful assertion of the defense is total freedom from liability. Note, Government Contract Defense: Sharing The Protective Cloak of Sovereign Immunity After McKay v. Rockwell International Corp., 37 Baylor L.Rev. 181, 183 (1985). A "crude all-or-nothing rule that places all the liability on the Government even though the manufacturer has done some wrong, is no more equitable than one that imposes liability on the manufacturer in excess of his actual responsibility: the government contract defense, in some instances, does nothing more than replace one unfairness with another." Johnston v. United States, 568 F.Supp. 351, 356-58 (D. Kan. 1983). The McKay court has over-extended the government contractor defense to a point

where it no longer serves its originally intended purpose. Note, Schoenborn v. Boeing Co.: The Government Contractor Defense Becomes a "Windfall" for Military Contractors, 40 U.Miami L.Rev. 287, 304 (1985). The defense was originally an equitable measure intended to prevent the court from imposing liability on an innocent contractor who, absent his relationship with the Government, the court would not force to bear the loss. Id. Government contractors can now escape their proper share of liability because the defense is no longer closely tailored to serve its intended purpose. Id. McKay and Koutsoubos have exaggerated and shifted from the contractor, who is now not so innocent, to the innocent plaintiff the unfairness that existed in a few isolated situations. Id. Although primarily based on claims of fairness, the current effect

of the defense is to grant government contractors an undeserved immunity from liability, while other contractors carry their share of the cost to society for defective products and innocent plaintiffs bear a loss that is not rightfully theirs. Id.

9. The Safest Possible Products Do Not Happen With Indemnity Or Immunity.

The contractor is in a position to correct the wrong or to make the wrong worse if given blanket immunity. Note, Schoenborn v. Boeing Co.: The Government Contractor Defense Becomes A "Windfall" for Military Contractors, 40 U.Miami L.Rev. 287, 295-96 (1985). When contractors have sought indemnification clauses or statutory immunity the Government has opposed it, arguing that broader protection for contractors would reduce their economic incentive to design and produce the safest

possible products. Id., at 296. Society will benefit from the deterrent effects of imposing design liability upon manufacturers with design discretion. Note, The Government Contract Defense: Should Manufacturer Discretion Preclude Its Availability?, 37 Me.L.Rev. 187, 208 (1985). If military suppliers are not held liable for injuries caused by their acts, they will have no incentive to produce safe products. In re "Agent Orange" Product Liability Litigation, 506 F.Supp. 762, 793 (E.D.N.Y. 1980), cert. denied sub nom., Diamond Shamrock Chemicals Co. v. Ryan, 465 U.S. 1067, 104 S.Ct. 1417, 79 L.Ed.2d 743 (1984). Their immunity from liability might actually encourage manufacturers to cut corners with respect to product safety, and thus, expose future users of military equipment to unnecessary risks. Note, 37 Me.L.Rev. at 108.

Indemnification removes the safety incentive created by the tort system.

Indemnification of Government Contractors: Hearing on S. 1254 Before the Senate Comm. on the Judiciary, 99th Cong., 1st Sess. 26 (1985) (statement of Richard K. Willard, United States Department of Justice). To the extent liability can be passed to the Government, neither the contractors nor the insurers have a financial interest in ensuring that a product is designed and made with the safety of the user in mind. Id.

In any case, existing law provides for indemnification in appropriate, carefully considered situations. 10 U.S.C. §2354; 50 U.S.C. §§1431-35 (P.L. 85-804); and 42 U.S.C. §2212 (Price-Anderson Act).

Thus, in order to encourage suppliers to produce safe equipment, liability should be the rule rather than immunity.

10. The Contractor Should Be Required To Warn The Government About The Risks Of The Product And Inform The Government About Design Alternatives Reasonably Known To The Contractor.

McKay requires only that the supplier warn the United States about patent errors in the Government's specifications or about dangers involved in the use of the equipment that were known to the supplier but not to the United States. Id., at 451. The Agent Orange test requires proof that the Government's knowledge of the hazards of the finished product was at least equal to that of the contractor. In re Agent Orange Product Litigation, 534 F.Supp. 1046, 1055 (E.D.N.Y. 1982).

In the Agent Orange test, if the contractor discovers dangers inherent in the product and fails to disclose those dangerous defects to the Government, the contractor cannot avail himself of the government contract defense unless the

Government possessed prior equivalent knowledge. Id., at 1047. The problem is that this duty to warn only pertains to defects of which the contractor had actual knowledge and not to dangers about which he should have known or which he should have discovered through inspection or testing. Note, Government Contract Defense: Sharing The Protective Cloak Of Sovereign Immunity After McKay v. Rockwell International Corp., 37 Baylor L.Rev. 181, 196 (1985). McKay suffers the same defect. The "knowledge prong" is crucial because the Government must be able to weigh the risk involved against the need for the product, and to make an intelligent determination of whether it should use the product. Note, Schoenborn, at 294-95. Because the manufacturer typically has a financial interest in the continued use of the product, however, the courts should

carefully watch the "knowledge prong" to assure strict compliance with the knowledge requirement, and to prevent an unscrupulous manufacturer from failing to adequately disclose the specifically involved hazards of the product to the Government. Id., at 295. One problem that arises from the "knowledge prong" of the Agent Orange and McKay tests is, by attaching liability for what the manufacturer knew, but failed to disclose, the court encourages manufacturers to know as little as possible about their products (ostrich immunity). Id. The better standard would be to hold the manufacturer liable for what he knew or should have known. Id. The "should know" standard would impose on the manufacturer a higher duty to warn the Government, which has less expertise, of any hazards in the product. Id.; Borel v. Fibreboard Paper Products Corp., 493 F.2d 1076 (5th Cir.

1973), cert. denied, 419 U.S. 869, 95 S.Ct. 127, 42 L.Ed. 107 (1974). A manufacturer is presumed to know of the vices in the things he makes, whether or not he has actual knowledge of them. Scott v. White Trucks, 699 F.2d 714, 716 (5th Cir. 1983); Cinnaminson Township Board of Education v. U.S. Gypsum Co., 552 F.Supp. 855, 860 (D.N.J. 1982); Belle Bonfils Memorial Blood Bank v. Hansen, 665 P.2d 118, 123 (Colo. 1983); Reiger v. Toby Enterprises, 609 P.2d 402, 404 (Or.App. 1980). Further, general practice in the industry should not be the standard. The T.J. Hooper, 60 F.2d 737 (2d Cir. 1932).

In Koutsoubos v. Boeing Vertol, 755 F.2d 352 (3d Cir. 1985), cert. denied, ____ U.S. ____, 106 S.Ct. 72, 88 L.Ed. 59 (1985), the court found that there had been a "back and forth" discussion between the Navy and Boeing about the specifications and

therefore the Government knew enough for the defense to attach. However, the key is whether there was knowing "back and forth" about the specific defect which caused plaintiff's injuries. Agent Orange, McKay, and Koutsoubos have set a standard by requiring that the Government know as much or more than the manufacturer about the hazards of the product so that it can balance the risks and benefits involved. Id., Note, Schoenborn, at 302. However, these cases do not require the manufacturer to learn of defects in its product and then inform the Government so there is a knowing decision to accept the very defect which caused plaintiff's injuries. For example, in Koutsoubos, to what avail was Boeing's recommendation that the Government install a detector for an earlier warning of bearing failure, if Boeing did not tell the Government how much time the pilot would

have between bearing failure and destruction of the aircraft? The Government must have the full picture necessary for an informed balancing of risks and benefits. Id., Note, Schoenborn, at 303. In In re Aircrash Disaster at Mannheim, Germany on 9/11/82, 769 F.2d 115, 125 (3d Cir. 1985), cert. denied sub. nom., Schoenborn v. Boeing Co., ____ U.S. ____, 106 S.Ct. 851, 88 L.Ed.2d 891 (1986), the Third Circuit applied the government contractor defense and held that the relevant knowledge required by the "knowledge prong" is "knowledge of a defect in an essential or key component of the mechanism." In so ruling, the court completely changed the test so that the Government need only know of a defect in a key component. Note, Schoenborn, at 303. This test is also lacking. Besides the fact that what is a "key component" remains subject to

case-by-case determination, the modified test does not even encourage manufacturers to work closely with the Government in designing a safe product because, now that their duty to warn is little more than a formality, their standard of liability is considerably less. Id. Further, the component that leads to injury may not be a "key component." It may be a very minor thing, such as a bolt of improper size. However, this "minor" bolt, if defectively designed or part of a defective design, may be the component which causes an aircraft to go out of control and crash. This is why the test should require the contractor to protect the product user by notifying the Government of all hazards associated with the product and of all reasonable alternatives which would eliminate or minimize such hazards. This Court must hold manufacturers to a "should know" standard in

the "knowledge prong" to encourage them to learn as much as possible about their product. Id., at 305. If a manufacturer has built a product to Government-established specifications and has notified the Government in full of any hazards associated with the product of which he knows or should know and of all reasonable alternatives which would eliminate or minimize such hazards, then he should be entitled to the protection of the government contractor defense if then directed to proceed. Id. This compensates the contractor for his inability to obtain indemnification from the Government. Id.

In O'Keefe v. Boeing Co., 335 F.Supp. 1104, 1124 (S.D.N.Y. 1971), the court suggested that a manufacturer which is involved in the design of a product may not have contract specification defenses available unless the alleged flaw in design

was the result of a conscious choice by the Government after balancing mission and safety considerations. Where the Government makes a conscious design choice and perhaps overrules the manufacturer as to a particular safety feature, the contract specification defense should be available to the manufacturer. Note, Liability Of A Manufacturer For Products Defectively Designed By The Government, 23 B.C.L.Rev. 1025, 1038 (1982).

The failure of the McKay and Agent Orange courts to indicate whether failure to warn of a manufacturer's constructive knowledge of a defect defeats the defense could produce the anomalous result of encouraging manufacturers to know as little as possible about the dangers of their products. Id., at 1078-79. To avoid this result, manufacturers should be liable for failure to disclose defects which are or

should be known to them. Id., at 1079. The test set forth in Shaw v. Grumman Aerospace Corp., 778 F.2d 736, 745-46 (11th Cir. 1985), cert. pending, solves much of this problem. If there is a conscious, intentional determination by the United States Government that a particular design which incorporates a particular safety device should be omitted, then the defense should attach. Sanner v. Ford Motor Company, 154 N.J.Super. 407, 381 A.2d 805, 806 (1977). There must be a conscious decision on the part of the military to accept a known hazard. Trevino v. General Dynamics Corporation, 626 F.Supp. 1330, 1334 (E.D. Tex. 1986). Further, the hazard which the military knowingly accepts must be the hazard which caused plaintiff's injuries. Shaw provides that the contractor must demonstrate that it both warned the military of the risks of the product or product part

that it designed and informed it of design alternatives "reasonably known" to the contractor. "Reasonable knowledge" should include the rule set forth in Borel v. Fibreboard Paper Products Corp., 493 F.2d 1076 (5th Cir. 1973), cert. denied, 419 U.S. 869, 95 S.Ct. 127, 42 L.Ed. 107 (1974), where a manufacturer is held to the knowledge and skill of an expert with regard to his products.

CONCLUSION

For the reasons set forth above, Amicus Curiae ATLA respectfully requests that this Court hold that the "government contractor defense" be available only if the contractor has taken the steps to protect the user of the product which comply with the suggested test set out at page 6 of this Brief.

Respectfully Submitted,

DALE HARALSON
Counsel of Record
DENNEEN L. PETERSON

HARALSON, KINERK & MOREY, P.C.
82 South Stone Avenue
Tucson, Arizona 85701
(602) 792-4330

ROBERT L. HABUSH, President
The Association of Trial
Lawyers of America
777 East Wisconsin Avenue, Ste. 2200
Milwaukee, WI 53202
(414) 271-0900

Attorneys for Amicus Curiae
The Association Of Trial Lawyers of America

CERTIFICATE OF SERVICE

Dale Haralson, an attorney for Amicus Curiae and a member of the Bar of this Court, certifies that on February 26th, 1987, copies of the foregoing Brief were served by mail upon all parties required to be served:
ATTORNEYS FOR PETITIONER

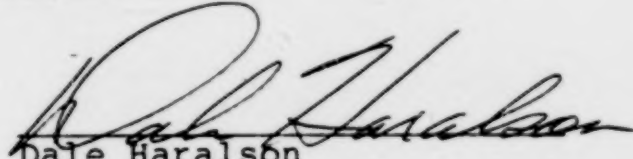
Louis S. Franecke, Esq.
John O. Mack, Esq.
MACK, HAZLEWOOD, FRANECKE & TINNEY
221 Pint Street, Suite 600
San Francisco, CA 94104
(415) 391-1560

Michael Moore, Esq.
CARTWRIGHT, SUCHERMAN & SLOBODIN, INC.
101 California Street, 26th Floor
San Francisco, CA 94111
(415) 433-0440

ATTORNEYS FOR RESPONDENT

Lewis T. Booker
Lonnie D. Nunley, III.
HUNTON & WILLIAMS
707 East Main Street
P.O. Box 1535
Richmond, Virginia 23212
(804) 788-8200

DATED THIS 26th day of February,
1987.


Dale Haralson

SUBSCRIBED AND SWORN to before me this
26th day of February, 1987.

Cynthia A. Meyer
Notary Public

My Commission Expires:

My Commission Expires Sept. 19, 1987

AMICUS CURIAE

BRIEF

FEB 25 1987

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CLERK

No. 86-492 ⁽⁸⁾

In the Supreme Court of the United States
OCTOBER TERM, 1986

DELBERT BOYLE, as personal representative of the
estate of David A. Boyle, deceased,
Petitioner,

vs.

UNITED TECHNOLOGIES CORPORATION,
Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT
OF APPEALS FOR THE FOURTH CIRCUIT

**BRIEF FOR EDWIN LEES SHAW AS AMICUS
CURIAE IN SUPPORT OF PETITIONER**

JOEL D. EATON, ESQUIRE
(Counsel of Record)

ROBERT L. PARKS, ESQUIRE

PODHURST, ORSECK, PARKS, JOSEFSBERG,
EATON, MEADOW & OLIN, P.A.

800 City National Bank Building
25 West Flagler Street
Miami, Florida 33130
(305) 358-2800

Counsel for Amicus Curiae

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**BRIEF FOR EDWIN LEES SHAW AS AMICUS
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INTEREST OF AMICUS CURIAE

Edwin Lees Shaw, in his capacity as personal representative of the Estate of his deceased son, Gary Scott Shaw, files this brief in support of the petitioner. Counsel for all parties have consented to its filing, and their written consents have been filed with the Clerk. Mr. Shaw has a direct interest in the outcome of this proceeding, because he is the respondent in another proceeding presently pending on a petition for writ of certiorari in this Court which involves the same central issue: *Grumman Aerospace Corp. v. Shaw*, Case No. 85-1529. In fact, it was the Eleventh Circuit's decision in that case—*Shaw v. Grumman*

Aerospace Corp., 778 F.2d 736 (11th Cir. 1985)—which provided the inter-circuit conflict which probably provoked the grant of certiorari in this case, and this Court's resolution of the central issue in this case may therefore determine the outcome in that case.

SUMMARY OF ARGUMENT

Space constraints preclude a thorough summary of our argument, so we will only briefly outline it here. *McKay* and its progeny, in practical effect, provide government contractors absolute immunity from traditional tort accountability for negligently designed products. This radical innovation in the law of torts was rested primarily upon the *McKay* Court's perception that *Feres* and *Stencel* prohibit government contractors from "pass[ing] the cost of accidents off to the United States" by factoring the cost of liability insurance into the cost of its products. This reasoning rests on a misreading of *Feres* and *Stencel*, however, because this Court has never rested the *Feres* doctrine on any desire to protect the public treasury. As the Court recently made clear in *Shearer*, the sole reason for the *Feres* doctrine is to prevent judicial inquiry into sensitive military affairs at the expense of military discipline. That problem is not implicated in the type of case presented here, however, because the military's "approval" of a contractor's negligent design is not an element of a plaintiff's *prima facie* case; it is injected into such a case only by proof of the *McKay* defense, and if the defense did not exist, the reason for the *Feres* doctrine would not be implicated. *McKay* is therefore simply *Feres* in disguise, but *Feres* misunderstood and misapplied. Once that is recognized, no reason—including the several alternative reasons offered by the *McKay* Court, each of which we will parse and explain away—exists for changing what the law has always been (and, peculiarly, what it

still is, even after *McKay*, where civilian plaintiffs are concerned): traditional accountability for tortious conduct.

That, in a nutshell, is our principal argument. We will also contend that, by removing traditional accountability in tort, the *McKay* defense removes all legal incentives for careful conduct. It thereby bodes ill for the safety and reliability of military equipment, and promises an increase in the "cost of accidents" to the government in the form of additional costly equipment and personnel losses. The defense will therefore simply aggravate precisely what it seeks to prevent, which is a good reason in itself to disavow it. We will also note that the position which we anticipate the government will assert here is diametrically opposed to the position which it has consistently asserted before Congress in the last three years—and we will urge the Court to accept the government's prior insistence there that the *McKay* defense is inappropriate and that its contractors should remain fully accountable for tortious conduct as an incentive to safety, rather than its inexplicable change of stripes here. We will urge that no form of the "government contractor defense" is necessary or justified. We will urge alternatively that, if any form of such a defense is to be recognized, it should be narrowly drawn in the far more principled form in which it was adopted by the Eleventh Circuit in the *Shaw* case.

ARGUMENT

The so-called "government contractor defense" which the lower court adopted below has been served up with a great deal of rhetorical flourish, but it comes down to a very simple proposition. The lower court has held, in effect, that the entire military defense industry must have total non-accountability and absolute immunity from

suit for the negligent design of its products—conduct considered tortious in every other segment of our society—simply because that tortious conduct has been “approved” by the government. This special privilege—granted to perhaps the largest and most powerful discrete segment of our society (at the expense of one of the least advantaged and most deserving segments of that society)—purportedly derives from a perceived need to ensure the effectiveness of our armed forces.

Curiously, however, this nation has fought several wars (and maintained effective interim peacekeeping forces) for decades upon decades, without anyone ever intuiting the need for such a defense. Certainly, no decision of this Court compels, or even suggests, such a defense. And, until very recently, no decision in the lengthy history of this nation’s jurisprudence ever suggested such a defense. Ten years ago, however, this Court prohibited military contractors from seeking indemnification or contribution from the government in *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666 (1977), and thereby motivated the defense industry to turn elsewhere for relief from what it perceived to be the onerous demands of tort accountability. The industry first mounted a concerted campaign in Congress to obtain legislation overruling *Stencel*. When that effort failed, the industry turned its concerted efforts to the courts, seeking an even greater prize—the abolition of tort accountability altogether.

The industry hit the jackpot in 1983, when it persuaded a divided panel of the Ninth Circuit that, decades of law and experience notwithstanding, the industry should be immunized from accountability in tort. *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), cert. denied, 464 U.S. 1043 (1984). Armed with this de-

cision, the industry thereafter toppled several other circuits (with one notable exception) like dominoes. Whether those unprecedented recent holdings will now become the law of the land is presently in this Court’s hands. Our purpose here is to demonstrate to the Court that the new “McKay defense” has no rational basis—either in the law, or in logic, or in public policy—and to convince it that the defense should be disavowed in favor of what the law has always been: traditional accountability for tortious conduct. We will urge alternatively that, if a “government contractor defense” is to be recognized in any form, it should be much more narrowly drawn, in the far more principled form in which it was adopted by the Eleventh Circuit in *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985).

I. THE “GOVERNMENT CONTRACTOR DEFENSE” ADOPTED BY THE LOWER COURT HAS NO RATIONAL BASIS IN LAW, LOGIC, OR PUBLIC POLICY, AND IT SHOULD BE DISAVOWED BY THIS COURT IN FAVOR OF TRADITIONAL ACCOUNTABILITY FOR TORTIOUS CONDUCT.

A. The historical background.

The “government contractor defense” proposed by the defense industry in this case is, as we have noted, a relatively recent development. Until a few years ago, it was simply accepted that government contractors were liable for injuries caused to military personnel by defectively designed products, and it rarely occurred to them that they might escape that liability by hiding behind the skirts

of the government.¹ The defense, to the extent that it was asserted at all, was usually rejected.² And to the extent that the defense was accepted at all, it was narrowly limited to provide immunity only from negligence actions for defective products *compelled* by a government-furnished design or a precise specification.³

We consider the progenitor of the new defense to be *In Re Agent Orange Products Liability Litigation*, 534 F. Supp. 1046 (E.D.N.Y. 1982). Although Judge Pratt's thoughtful decision in that case has been expanded by subsequent developments beyond recognition, the actual holding of the case is a narrow one (and not unlike the holding of the prior decisions requiring government *compulsion* as a predicate for the defense). According to Judge Pratt,

1. See, e. g., *Vasina v. Grumman Corp.*, 644 F.2d 112 (2nd Cir. 1981); *Lindsay v. McDonnell Douglas Aircraft Corp.*, 460 F.2d 631 (8th Cir. 1972); *Boeing Airplane Co. v. Brown*, 291 F.2d 310 (9th Cir. 1961); Annotation, *Right of Member of Armed Forces to Recover from Manufacturer or Seller for Injury Caused by Defective Military Material, Equipment, Supplies, or Components Thereof*, 38 A.L.R.3d 1247 (1971) (and 1986 supplement).

2. See *Challoner v. Day & Zimmermann, Inc.*, 512 F.2d 77 (5th Cir.), *vacated on other grounds*, 423 U.S. 3 (1975). Cf. *Boeing Airplane Co. v. Brown*, *supra*; *Whitaker v. Harvell-Kilgore Corp.*, 418 F.2d 1010, 38 A.L.R.3d 1229 (5th Cir. 1969); *Foster v. Day & Zimmermann, Inc.*, 502 F.2d 867 (8th Cir. 1974).

3. See *Merritt, Chapman & Scott Corp. v. Guy F. Atkinson Co.*, 295 F.2d 14, 16 (9th Cir. 1961) ("It is elementary that compulsion must exist before the 'government contract defense' is available.").

Although the Fifth Circuit recently purported to adopt the same defense adopted by the lower court in this case, the case actually involved an "innocent" contractor *compelled* to produce a defective product designed by the government—and the quite different issue presented here, where the contractor is the product's designer, was expressly left open. *Bynum v. FMC Corp.*, 770 F.2d 556 (5th Cir. 1985). Compare *Trevino v. General Dynamics Corp.*, 626 F. Supp. 1330 (E.D. Tex. 1986) (concluding that *Bynum* provides no defense where contractor designed defective product and government merely "approved" design).

the "government contractor defense" is available only (1) where "the product in issue [is] one for which the government *established the design and specific characteristics*" (534 F. Supp. at 1056); (2) the product met the government's specifications in all material respects; and (3) the government knew as much or more than the defendant about the hazards to people that accompanied use of the product. According to Judge Pratt, if "the contract set forth merely a 'performance specification', as opposed to a specified product, then the government contractor defense would be far more restricted than as described here". 534 F. Supp. at 1056. If that formulation of the defense were applied to the facts in the instant case, or to the facts in any of the similar cases presently pending in this Court, the plaintiffs would clearly prevail—because it cannot fairly be disputed in the several cases presently before the Court that the military supplied only general specifications, and that the contractors themselves actually designed the specific characteristics of the defective products in issue.

Unfortunately, the Ninth Circuit (over a vigorous and compelling dissent) recently adopted Judge Pratt's formulation of the "government contractor defense", and *expanded* it to a point where, for all practical purposes, it now confers absolute immunity upon military contractors for every product designed by them at the behest of the government, so long as the government "approves" the contractor's design of the product. *McKay, supra*. Because "approval" will indisputably exist with respect to every product ultimately purchased by the military, since "approval" is implicit in the act of purchase itself, *McKay* effectively threatens to render military contractors absolutely immune from all product liability actions. A number of other circuit courts, including the lower court in the instant case, have uncritically followed *McKay* in re-

cent months. We do not propose to parse all of the decisions which are consistent with *McKay*, since they can fairly be considered mere progeny of *McKay*. What we propose to do is to demonstrate that *McKay* was wrongly decided, and the error of the remaining decisions, including the decision of the lower court in this case, will naturally follow.

B. McKay's primary rationale—Feres in disguise.

We ask the Court to note first that *McKay*, by its own terms, applies only to plaintiffs who are active duty members of the military, and who are injured in the line of duty—because it is applicable only where “the United States is immune from liability under *Feres* and *Stencel* . . .”. 704 F.2d at 451. See *Feres v. United States*, 340 U.S. 135 (1950); *Stencel*, *supra*. If any of the several negligently designed aircraft at issue in the several cases presently pending in this Court had crashed into a school yard and killed a dozen children, the judiciary would be considered perfectly competent to entertain tort actions for the redress of their wrongful deaths and to pass upon the reasonableness of the aircraft's design—and the contractor would clearly be held accountable in tort for its defective design of the aircraft. See, e. g., *Moyer v. Martin Marietta Corp.*, 481 F.2d 585 (5th Cir. 1973) (civilian pilot killed during test of B-57). The same can be said if the aircraft in issue here were one of the defense industry's numerous aircraft manufactured for civilian use. See, e. g., *Noel v. United Aircraft Corp.*, 342 F.2d 232 (3rd Cir. 1964). And the same can be said if the product in issue here had been designed for, and approved and purchased by, a civilian agency of the government.

While that is clear from the terms of *McKay* itself, it is also made perfectly clear by *Lockheed Aircraft Corp. v.*

United States, 460 U.S. 190 (1983), in which all the material facts, save one, were identical to the facts in *Stencel*. The only material fact which differed from those in *Stencel* was that the plaintiff's decedent was a civilian employee of the military, rather than a member of the military. Upon that single factual difference, this Court held that neither *Feres* nor *Stencel* were implicated, and that the government was not immune from suit seeking indemnification for the negligent design of a military aircraft. It logically follows that the *McKay* defense, by its own terms, is unavailable where the victim of a negligently designed military aircraft is a civilian.

Once it is recognized that the *McKay* defense is available to a government contractor *only* when the plaintiff is an active duty member of the contractor's military customer, it becomes clear that the *McKay* defense is simply *Feres* in disguise, expanded to protect not only the government, but also its military contractors by virtue of their contractual liaison with the government. The effect of this expansion of *Feres*, of course, is to enlarge the circumstances in which servicemen are relegated to second-class citizenship, deprived of rights and remedies granted by the law to all other citizens of the nation. In our judgment, such a stark deprivation must have a *very* good reason to support it. And because the primary, and perhaps sole, reason for the *McKay* defense is *Feres*, we think the only relevant question here is whether *Feres* requires or justifies the broad “government contractor defense” bottomed upon it by the *McKay* Court.

C. The fundamental misunderstanding of Feres.

The *McKay* Court opined that *Feres* and *Stencel* compelled recognition of a broad “government contractor defense” primarily for the following reason:

The reasons for applying the government contractor defense to suppliers of military equipment with design defects approved by the government parallel those supporting the *Feres-Stencel* doctrine. First, the Supreme Court emphasized in *Stencel* that the United States cannot be directly or indirectly liable to servicemen injured by defective military products. But holding the supplier liable in government contractor cases without regard to the extent of government involvement in fixing the product's design and specifications would subvert the *Feres-Stencel* rule since military suppliers, despite the government's immunity, would pass the cost of accidents off to the United States through cost overrun provisions in equipment contracts, through reflecting the price of liability insurance in the contracts, or through higher prices in later equipment sales.

704 F.2d at 449. In our judgment, there are two very fundamental flaws in this reasoning—one general, and one specific with respect to the facts in at least one (and possibly others) of the several similar cases presently pending in this Court.

1. The general fundamental flaw in this reasoning is a misunderstanding and misapplication of the *Feres* doctrine. Although a number of rationales have been advanced for the *Feres* doctrine over the years, this Court has *never* sought to justify it on the ground that the United States should not bear the cost of accidents to its military personnel. The primary, perhaps exclusive, rationale for the *Feres* doctrine is the fear that allowing tort suits against the government will involve the judiciary in sensitive military affairs at the expense of military discipline—and although other arguably makeweight rationales have been advanced for the doctrine from time to time, no court has ever held that the second-class citizenship created by *Feres* is justified by the notion that the public treasury

must be protected at any cost. See *Rayonier, Inc. v. United States*, 352 U.S. 315 (1957) (noting that the very purpose of the Federal Tort Claims Act is to shift the losses caused by negligent conduct from the victim to the public treasury); *Johnson v. United States*, 749 F.2d 1530 (11th Cir. 1985), *approved on reh'g en banc*, 779 F.2d 1492 (11th Cir. 1986), *cert. granted*, case no. 85-2039 (*Feres* bars FTCA action only when maintenance of suit might compromise military discipline); *Shaw, supra* (similar).

If there were ever any doubt about that, the doubt was clearly laid to rest by this Court's most recent decision on the subject—*United States v. Shearer*, 473 U.S. 52, 87 L. Ed.2d 38 (1985). In that case, this Court finally made it clear that the only relevant considerations in determining whether the *Feres* doctrine is implicated are “whether the suit requires the civilian court to second-guess military decisions . . . and whether the suit might impair essential military discipline”—and that the other rationales for the doctrine which have appeared from time to time in the decisional law are “no longer controlling”. *Shearer, supra*, 87 L. Ed.2d at 44, 44 n. 4. In short, *Shearer* rejects the primary underpinning of *McKay*—and the *McKay* Court has therefore expanded the *Feres* doctrine for a reason which does not even support the *Feres* doctrine. That, in our judgment, is unreasonable in the extreme.

The propriety of expanding *Feres* to the type of situation presented here might at least be open to debate if maintenance of suits against government contractors implicated the primary supporting rationale of *Feres* in some way, but it does not. Where the issue is whether the contractor's design of a product is negligent or defective, there is no need to scrutinize any military orders or actions, or otherwise threaten the military disciplinary structure in any way—because it is the design which is

being challenged, not the military's ultimate "approval" of it. The only extent to which the military's role has been injected into this and the similar cases pending in this Court is by the contractors' proof of the military's "approval" of their defective designs—but the only reason that fact was injected into any of the cases was because of the contractors' pursuit of the "government contractor defense". If the defense did not exist, then no reason would exist for the military's role in the procurement of the various aircraft in issue to be scrutinized at all. See *Shaw, supra*. The best way to avoid the concerns of the *Feres* doctrine is therefore simply to decline to recognize the *McKay* defense.

While we are on the subject of the primary supporting rationale of *Feres*, we should note that this Court has recently granted certiorari in a case which may well be dispositive of the propriety of the primary underpinning of *McKay*. In *Johnson v. United States, supra*, after an extensive and thoughtful analysis of the underlying rationales of *Feres* (considered in the new light now cast by *Shearer*), the Eleventh Circuit recently held that the *Feres* doctrine did not bar a tort action by the survivors of a military pilot killed by the negligence of the FAA, a civilian agency of the government, because maintenance of the suit would not involve the judiciary in sensitive military affairs at the expense of military discipline. If that decision is ultimately affirmed by this Court, the result will be that *Feres* does not bar tort actions by military personnel for the negligence of civilian agencies of the government, and it would logically seem to follow that the *McKay* Court's concern for the public treasury is irrelevant and misplaced—and that *Feres* therefore should not bar similar tort actions for the negligence of a civilian contractor of the government.

For all of the foregoing reasons, we therefore believe that the *McKay* Court misunderstood and misapplied *Feres*, and that the "government contractor defense" recognized in *McKay* and its progeny is therefore bottomed upon both misinformed analysis and an erroneous legal foundation. If *Feres* means what this Court said it means in *Shearer*, *McKay's* expansion of *Feres* to protect the civilian defendants in this and the other similar cases pending here is a rule without a reason—and a rule which is therefore clearly indefensible.

2. Quite apart from the *McKay* Court's general failure to perceive that *Feres* and *Stencel* do not rest upon any desire to protect the public treasury, the *McKay* Court's reasoning contains a more specific, but equally fundamental flaw—at least on the facts in the *Shaw* case, and perhaps on the facts in the other cases pending here. As we read *McKay*, the Court's primary fear was that, absent a "government contractor defense", government contractors would "pass the cost of accidents off to the United States" (704 F.2d at 449), by factoring the cost of liability insurance into the price of their products. Frankly, we fail to see why such a result is undesirable. Such a result has long been endorsed in the jurisprudence of this nation as a perfectly acceptable manner of shifting the loss sustained by the innocent victim of a negligently designed product to the product itself, and thereby spreading that societal cost to the segment of the society which purchases the product, or even to the society at large. That is precisely how the tort system is designed to work in the products liability context in every other segment of the nation's economy. See, e. g., *East River Steamship Corp. v. Transamerica Delaval, Inc.*, 106 S. Ct. 2295, 90 L. Ed.2d 865 (1986) (incorporating common law of product liability into general maritime law to promote safety and shift

losses from victims of defective products). And if such a result is deemed desirable where civilian consumers are concerned, no reason suggests itself why the same result should be undesirable where military consumers are concerned—unless, as the *McKay* Court claimed it perceived, *Feres* or *Stencel* compel such a peculiar conclusion. As we trust we have demonstrated, however, there is nothing in *Feres* and *Stencel* which purports to prohibit tort actions merely to prevent victims' losses from being shifted and spread to the society at large.

In any event, whatever merit the *McKay* Court's concern might possess in the abstract, it certainly has no relevance in the *Shaw* case, because the government's contract with Grumman required it to purchase liability insurance to cover claims of the type in issue here, and the contract price of the aircraft in issue in the *Shaw* case included the cost of purchasing liability insurance (Respondent's Brief in Opposition in case no. 85-1529, pp. 2-3). The government has therefore already bought and paid for liability insurance to cover the plaintiff's claim in the *Shaw* case. It is also probable that liability insurance coverage has been obtained in the other similar cases pending here—because, according to testimony recently given before Congress by a representative of the Department of Defense, "insurance is in fact an allowable cost on defense contracts".⁴

In our judgment, it would make no sense whatsoever for this Court to immunize Grumman and its insurers

4. *Government Contractors' Product Liability and Indemnification Acts, 1984: Hearings on H. R. 4083 and H. R. 4199 Before the Subcommittee on Administrative Law and Governmental Relations of the Committee on the Judiciary, 98th Cong., 2nd Sess., Ser. No. 39, p. 48 (March 14 and 15, 1984) (testimony of Mary Ann Gilleece, Deputy Under Secretary of Defense for Acquisition Management) (hereinafter House Hearings).*

(or any other similarly situated government contractors and their insurers) from tort liability out of fear that the cost of liability insurance will be passed along to the government, when the government has already consented to paying that cost; when the government has actually paid that cost; and, indeed, when the government, as in the *Shaw* case, has required the contractor to purchase liability insurance for the benefit of victims of defects in the design of its product, and for the precise risk involved in such a case. If the *McKay* defense is applied to the facts in such cases, the government will not benefit from it in the slightest. Instead, it will have paid for liability insurance to cover a non-existent liability—and the *only* beneficiaries of the defense will be windfall beneficiaries, the insurers who pocketed no-doubt substantial premiums for illusory, unnecessary coverage. On the facts in *Shaw* at least, we therefore think the *McKay* defense is illogical in the extreme—and that the plaintiff should receive the benefit of the insurance coverage which the government mandated and purchased for his benefit.

And with respect both to the *Shaw* case and the other cases pending here, we would remind the Court simply that the executive branch of the government has already determined as a matter of policy that the cost of insurance is "an allowable cost on defense contracts", and we therefore respectfully submit that the *McKay* Court had no business concluding that the public policy of the government should be otherwise. Certainly, nothing in *Feres* or *Stencel* compels that type of interference with the policy judgments of the executive branch, and since the only place the *McKay* Court purported to find any authority for that interference was in *Feres* and *Stencel*, the reasoning by which the *McKay* Court invented the "government contractor defense" in issue here is fundamentally and fatally flawed.

D. The illogic of the other reasons mustered for the defense.

1. Although *McKay*'s "government contractor defense" clearly rests solely upon a misapplication of *Feres*, the *McKay* Court and the courts which have followed its lead have mustered several additional reasons for erecting the defense. One reason consistently advanced is that the defense is compelled by this Court's decision in *Yearsley v. W. A. Ross Construction Co.*, 309 U.S. 18 (1940). We think *Yearsley* has been badly misread. In *Yearsley*, the issue was whether a private corporation, whose activities under a government contract resulted in a non-tortious "taking" of real property from another, was answerable in damages for the taking. This Court reached the perfectly sensible conclusion that when the government exercises its constitutional power of eminent domain by delegating it to a private agent, the deprived property owner's remedy lies against the government under the Fifth Amendment, rather than against the agent to whom the power has been delegated.

There is no delegation of constitutional governmental powers involved, however, when a private contractor merely designs, manufactures, and sells a product to the government under a cost-plus-incentive-fee contract. And when *Yearsley* has been asserted in that context in an effort to avoid tort liability for an injury caused by a defective product (or to avoid other obligations imposed by the law upon private entities), the lower courts have consistently held (until *McKay*) that it provides no such defense.⁵ This Court itself has held on several occasions

5. See, e. g., *Whitaker v. Harvell-Kilgore Corp.*, 418 F.2d 1010, 38 A.L.R.3d 1229 (5th Cir. 1969); *Foster v. Day & Zimmermann, Inc.*, 502 F.2d 867 (8th Cir. 1974); *S. O. G.-San Ore-Gardner*

(Continued on following page)

that neither *Yearsley* nor any other legal principle immunizes private entities from obligations imposed upon them by law, merely because of their "independent contractor" relationships with the government.⁶ And because of all of these decisions, it can safely be said that *Yearsley* has been limited to its unique facts (governmental exercise of the power of eminent domain through delegation to a private agent); that it provides no impetus whatsoever for the broad immunization of the government's independent contractors effected by *McKay* and its progeny; and that it is therefore simply an inappropriately mustered makeweight for the *McKay* defense.

2. Another reason mustered for the defense was the *McKay* Court's concern that the judiciary should not be thrust "into the making of military decisions", because its "otherwise omniscience confronts its limits in military matters". 704 F.2d at 449. A similar sentiment—that lay juries are simply unqualified to pass upon the reasonableness of the design of military equipment—has been advanced by *McKay*'s progeny. See *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986).⁷ If that were a legiti-

Footnote continued—

v. Missouri Pacific Railroad Co., 658 F.2d 562 (8th Cir. 1981); *United States v. Pennsylvania Environmental Hearing Board*, 584 F.2d 1273 (3rd Cir. 1978); *United Bonding Insurance Co. v. Catalytic Construction Co.*, 533 F.2d 469, 44 A.L.R. Fed. 764 (9th Cir. 1976).

6. See, e. g., *United States v. Boyd*, 378 U.S. 39 (1964); *United States v. City of Detroit*, 355 U.S. 466 (1958); *Powell v. United States Cartridge Co.*, 339 U.S. 497 (1950); *Penn Dairies, Inc. v. Pennsylvania Milk Control Commission*, 318 U.S. 261 (1943); *Brady v. Roosevelt Steamship Co., Inc.*, 317 U.S. 575 (1943); *Alabama v. King & Boozer*, 314 U.S. 1 (1941); *Curry v. United States*, 314 U.S. 14 (1941); *Keifer & Keifer v. Reconstruction Finance Corp.*, 306 U.S. 381 (1939).

7. In the *Shaw* case, the facts were tried non-jury. Presumably, and in order to be consistent, the *Tozer* Court would also have to conclude that United States District judges are unqualified to pass upon the reasonableness of the design of military equipment.

mate reason for abolishing accountability in tort, however, then a substantial portion of the law of torts should be abolished because many negligence actions challenge the reasonableness of the conduct of actors with expertise well beyond that of the lay jurors empaneled to decide the facts. The same can be said of numerous other types of actions for accountability, both civil and criminal, where the underlying facts are complex and require expertise to resolve. The solution is (and always has been) not to abolish accountability altogether, but to allow (and, in some cases, like actions for professional negligence, to require) expert testimony on the ultimate issues to aid the finder-of-fact in understanding and resolving the facts. And, unless this Court is prepared to upset decades of the nation's jurisprudence and hold, as the *McKay* and *Tozer* Courts appear to have reasoned, that accountability in tort is unacceptable in any case complex enough to require expert testimony, then we respectfully submit that this reason for the *McKay* defense should be rejected out of hand as wholly insufficient.

3. As an additional reason for erecting a broad "government contractor defense", the *McKay* Court noted that "the United States is required by the exigencies of our defense effort to push technology toward its limits and thereby to incur risks beyond those that would be acceptable for ordinary consumer goods". 704 F.2d at 449-50. Whatever merit that reason may have in the abstract, it certainly has no relevance to the factual circumstances in the several cases presently pending here. In the *Shaw* case, for example, the aircraft's longitudinal flight control system was not even remotely on the "cutting edge of technology"—and even Grumman conceded at trial that the system was perfectly "conventional" in every respect, and had been in use for many years in both military and

civil aircraft (Respondent's Brief in Opposition, case no. 85-1529, p. 5). The same thing would appear to be true in each of the several cases presently pending here.

In our judgment, the "state of the art" is a fact to be considered in determining whether a particular design is or is not negligent; it is not a justification for immunizing a contractor from tort liability altogether—especially in a case where the technology in issue has been in existence for decades. Put another way, where technology has been pushed to its limits, it is unlikely that a design will be found negligent or defective—and no good reason suggests itself why government contractors should be immunized from liability in *all* cases, merely to prevent the possibility of an unlikely finding of negligence in the rare case in which the technology of a design is on the so-called "cutting edge". This reason for the defense is therefore also little more than a makeweight.

4. The *McKay* Court also reasoned that recognition of "a government contractor defense provides incentives for suppliers of military equipment to work closely with and to consult the military authorities in the development and testing of "equipment", and "therefore encourages fixing the locus of responsibility for military equipment design with more precision than is possible under a system where the government contractor rule is not allowed". 704 F.2d at 450. We frankly do not understand this reason, and to the extent that we think we understand it, we believe it is a non-sequitur. (The Eleventh Circuit also did not understand this reason in *Shaw, supra*, and simply declared it "inscrutable". (778 F.2d at 743.) Certainly, there are incentives enough for suppliers of military equipment to work closely with and to consult the military authorities in the development of equipment, whether the government contractor defense exists or not—because the gov-

ernment imposes those incentives upon suppliers of military equipment as a precondition to development of equipment in the absence of such a defense (which is fully illustrated by the relationship between the military and the various contractors involved in the several suits presently pending here, which arose well before anyone even thought of inventing the defense).

We should also note that the government itself has expressed puzzlement with this rationale for the *McKay* defense, and has suggested on the public record—in testimony before Congress, in response to a question concerning its position on the *McKay* defense—that the defense will have precisely the opposite effect of that envisioned by the *McKay* Court:⁸

We have expressed in litigation serious reservations about some forms of the Government contractor defense for reasons similar to those stated in my testimony, that is, that it can drive a wedge between what ought to be a cooperative effort between the Government and its contractors in developing specifications. I think the state of the law in this area is not settled, and we would hope to influence the courts to move the law in a direction that would be, in our view, more helpful than some cases have established.

In addition, if it is the purpose of the judiciary to “encourage . . . fixing the locus of responsibility for military equipment design with more precision” that it is presently being fixed, then it makes more sense to us to place the responsibility upon the *designer* of the equipment, rather than the clearly less expert customer who has merely

8. *House Hearings, supra*, p. 76 (testimony of Richard K. Willard, Acting Assistant Attorney General, Civil Division, Dept. of Justice).

“approved” the design.⁹ If the government had the same expertise in designing the products for which it contracts, there might be some justification in moving the “locus of responsibility” away from the “designer” and toward the “approver”, but the government clearly has no such expertise, else it would design the products itself. The government has also put that position on the public record:¹⁰

Some of the earlier testimony seems to represent what I think is an unrealistic picture of the way specifications are developed for Government contracts, particularly in high technology areas. The F-18 was not designed in great detail by a gnome in the Pentagon with the blueprints then handed out to see whatever contractor wanted to bid on them. Many of these sophisticated procurement matters are primarily, if not entirely, a result of designs developed by contractors, not by Government employees, and that is the way it should be. The Government does not have the expertise to go around developing many sophisticated high technology matters; we have to rely on the expertise of the private sector. That has been a great benefit to our country.

In short, this reason may support the defense where the government has designed the product and thereby *compelled* its manufacture in defective form, but it clearly does not support the defense where the contractor is to blame for the defective design.¹¹

9. This would seem to be an especially compelling conclusion in cases, like the *Shaw* case, in which the contract expressly places the responsibility for the design upon the contractor and disclaims any government responsibility for the design (Respondent's Brief in Opposition, Case no. 85-1529, pp. 3-4).

10. *House Hearings, supra*, p. 50 (testimony of Richard K. Willard).

11. It is possible that the *McKay* Court's concern in advancing this reason was its unarticulated perception that both the contractor and the government are at fault when a negli-

(Continued on following page)

5. Finally, we are constrained to note once again that the *McKay* defense applies by its own terms only to cases in which the plaintiffs are active duty servicemen, since it applies only when the government itself would be immune from suit because of *Feres* and *Stencel*. If the plaintiffs in any of the several cases presently pending here had been our hypothetical civilian school children, the reasonableness of the designs of the several aircraft in issue here would be freely scrutinizable (just as they always were for decades in cases involving military plaintiffs, before the *McKay* Court changed the rules), and the cases would have proceeded as routine products liability cases, with full confidence in the judiciary's competence to decide them—notwithstanding *Yearsley, supra*, or the need for expert testimony, or the state of the technology involved, or the close working relationships between the government and its private contractors. (Moreover, as we have also previously noted, no “military decisions” would be questioned in our hypothetical cases, because the military's role in approving the negligent designs becomes relevant only if the “government contractor defense” exists). If the several additional reasons which the *McKay* Court mustered in support of its defense do not support recognition of the defense in our hypothetical cases, then they

Footnote continued—

gently designed and subsequently “approved” product injures or kills a serviceman, and that it is somehow unfair for the contractor to be held liable when the government cannot be held accountable. If that is the motivation behind this reason, there is a simple answer to it.—The law of torts has always recognized that the existence of concurrent negligence by an unaccountable joint tortfeasor is an insufficient reason for relieving an accountable tortfeasor from the consequences of his concurring negligence. See, e. g., *Boeing Airplane Co. v. Brown*, 291 F.2d 310 (9th Cir. 1961); *Restatement (Second) of Torts*, §439. See generally, *Harper, James & Gray, The Law of Torts*, §20.3 (2nd Ed. 1986). That principle is thoroughly settled in the law of torts, and if it is an acceptable principle in all other contexts, it should be an acceptable principle in the isolated context at issue here.

provide no support for the defense in the instant case. In the final analysis, *McKay* and its progeny are clearly bottomed exclusively upon a misunderstanding and misapplication of *Feres*, and their remaining “reasons” are simply makeweights. We therefore respectfully submit that the *McKay* defense has no rational basis in the law, or in logic, or in public policy—and that it should be disavowed by this Court as a result.

E. The sacrifice of safety.

A word is in order concerning something which the majority in *McKay* simply ignored—accountability, and its mirror image, responsibility. In its simplest terms, when a product designer faces legal accountability for negligent designs which cause unnecessary injury or death to others, it is given a strong incentive to exercise care in its design to avoid those consequences. As this Court recently put the point, “. . . ‘public policy demands that responsibility be fixed wherever it will most effectively reduce the hazards to life and health inherent in defective products that reach the market.’” *East River Steamship Corp. v. Transamerica Delaval, Inc., supra*, 90 L. Ed.2d at 874. When that accountability is removed, the incentive is similarly removed—and a designer can cut corners at will, comfortable in the knowledge that as long as it can sneak the cut corner by its less expert customer and obtain “approval” of the design, it will be absolutely immune from any legal accountability for its tortious conduct.

Worse still—and this is perhaps the most unacceptable ramification of the *McKay* defense—if the defense is adopted, defense contractors will have no legal incentive whatsoever to correct previously-approved designs which have proven dangerously defective in service. Instead, they can simply ignore the fatal consequences of

their negligent designs, comfortable in the knowledge that the government's initial approval of the designs will entirely insulate them from any accountability which would normally flow from their failure to correct the known dangerous designs. The result of all this will be that the reasonableness of military equipment designs, as well as the reasonableness of future corrective action for designs proven in service to be dangerous, will depend solely upon the less expert judgment of the military, in its capacity as customer, rather than the expert designers themselves. This result, in our judgment, bodes ill for the safety and reliability of equipment designed and manufactured by civilians for the national defense, and it is a result which this Court clearly would not countenance in any other context.

In addition, removing the incentive for safety which is at the heart of accountability in tort may actually promote what the *McKay* defense seeks to prevent—"pass[ing] the cost of accidents off to the United States". Each of the defective aircraft in issue in the several suits presently pending in this Court cost the government many millions of dollars apiece. The several destroyed aircraft involved have therefore clearly cost the government a staggering amount, not to mention the government's substantial investment in training the crew members who were also lost. When weighing the social costs of legal accountability against non-accountability, this "cost of accidents" to the government clearly must be kept in mind. And, in our judgment, as long as legal accountability results in safer products, which is the prevailing jurisprudential notion in this nation, the cost to the government of contractor accountability can never be as great as the ultimate cost to it of non-accountability. We therefore think the *McKay* defense actually aggravates pre-

cisely what it seeks to prevent, which should be reason enough to disavow it in favor of traditional tort accountability in cases like this one.

The point is important to us for another reason. Servicemen, like civilians, are people. Their business is, by its essential nature, dangerous. To die in defense of one's country is one thing; to die unnecessarily because of a defect in a product negligently designed and manufactured by a profit-oriented private corporation is quite another. And to deny the widows and surviving children of the military pilots of this nation just compensation for their wrongful deaths, merely because an inexperienced bureaucrat did not detect an unnecessary danger created by the experts paid to design the product because of their expertise—is, in our judgment, unthinkable. Our servicemen deserve far better than what they got from *McKay* and its progeny.

The point was nicely made by Judge Alarcon in his thorough and thoughtful dissent in *McKay*.

... [T]he majority suggests that to treat military personnel "as ordinary consumers would demean and dishonor the high station in public esteem to which, because of their exposure to danger, they are justly entitled." ... While all can agree that military personnel are entitled to the high honor and esteem in which they are held, I take issue with the majority's description of its source.

Military personnel are honored and esteemed because they are willing to fight for their country and risk their lives doing so. They are not so respected because they are sometimes forced by their calling to use unsatisfactory or unsafe equipment. It is the military's, Rockwell's and this court's duty to insure that our servicemen are provided with reliable and safe equipment. Just as the Military can make

any parachute packer take one that he has just folded and make him jump with it, the court should require that Rockwell stand behind the products for which it voluntarily contracts and provides at a profit. To extend the contractor defense in the way the majority suggests will only result in more unsafe and unreliable equipment. To do so would unnecessarily increase the danger which our military personnel face so patriotically.

704 F.2d at 461. We commend the remainder of Judge Alarcon's dissent to this Court—and we submit that, of the two opinions in *McKay*, Judge Alarcon's dissenting opinion is clearly the better reasoned one. Traditional tort accountability for negligently designed products should be retained.

F. The position of the United States.

The United States was invited to file a brief in the *Shaw* case, and it did so—and we have been advised that it intends to file a similar brief on the merits in this case as well. Having the benefit of the government's brief in the *Shaw* case, we assume that it will take the position here which it took there—that the *McKay* defense should be adopted for the reasons set forth in *McKay* and its progeny, and that the failure to do so “will substantially disrupt the weapons procurement process” (Brief for the United States, case no. 85-1529, p. 10). In our judgment, the government's argument, like the *McKay* defense itself, is constructed upon a collection of untested assumptions and unverified hypotheses—all of which are thoroughly disproven by the demonstrable fact that the “weapons procurement process” worked very well for decades upon decades before anyone ever intuited the need for such a defense, and before the defense industry, chagrined at *Stencel*, finally convinced the *McKay* Court that it should

be immunized altogether from accountability in tort. We therefore suggest that the Court exercise considerable caution before it accepts the government's assertions at face value.

There is another, equally important reason why the government's assertions here should not be taken at face value: less than three years ago, in testimony before Congress, the government took precisely the opposite position from the one it has taken here—contending that the *McKay* defense was inappropriate; that, to promote safety, the government preferred that its contractors remain accountable under traditional tort principles; and that the government preferred to contract for military products in an environment similar to the commercial marketplace, in which product manufacturers protect themselves against tort actions with liability insurance, for which the government was willing to pay. We have already quoted some of the relevant testimony; additional relevant excerpts of the testimony follow:¹²

The subject of indemnification creates a difficult balance. The issue concerns whether the contractor should cover potential risks through insurance or should the Government provide indemnification. In the commercial world, risks of third party liability are covered by insurance or are assumed by the manufacturer. In defense contracting, we believe this should also be the case except for exceptional circumstances involving unusually hazardous or nuclear risks which DOD does indemnify. We are concerned that

12. *House Hearings, supra*, pp. 46 (statement of Mary Ann Gilleece), 62, 64 (statement of Richard K. Willard). Similar, more recent testimony from both Ms. Gilleece and Mr. Willard can be found in their testimony before a Senate Committee considering a companion bill: *Indemnification of Government Contractors, 1985: Hearings on S. 1254 Before the Committee on the Judiciary, 99th Cong., 1st Sess., Ser. No. J-99-32* (June 11, 1985).

blanket indemnification may reduce the contractor's incentive to assume responsibility for the performance of their products by shifting part or all of the liability onto the Government. We prefer to contract in an environment similar to the commercial marketplace where companies must take all the steps that would be required by a prudent businessman in order to ensure the safety of the company's product.

Shifting tort liability from the person directly responsible for injuries undermines the function of tort liability as a means of causing a person to act with due care. Proponents of these bills have not shown that it is advisable to abrogate existing financial incentives for complying with the duties which the law has developed. In essence, we believe that the contractors with the United States, and not the taxpaying public, should be responsible for their acts or omissions.

... Every economic incentive should be used to encourage design and production of the best and safest products. Proposals to do away with the normal economic incentives—including incentives to avoid personal injury liability which are at the heart of the tort system—run counter to every advantage gained from a free enterprise system. We should work to maximize these advantages, rather than to do away with the economic incentives.

The government will no doubt respond that this testimony was given in response to the defense industry's concerted effort to obtain legislation from Congress overruling *Stencel*, and thereby obtain rights of action for indemnification and contribution against the government. If that observation is made, it will be correct. However, the observation will not change the fact that the testimony was nevertheless given in exactly the form we have quoted it throughout this brief—and it will probably serve only

to explain why the government has changed its position 180° here, since adoption of the *McKay* defense is perhaps the simplest way for the government to avoid future demands upon it by the defense industry for indemnification and contribution. We may perhaps be attributing an ulterior motive to the government which it does not deserve, but we can find no other explanation for its assertion of two diametrically opposed positions on the public record in the spans of three and two short years. Perhaps the government can explain away its change of position to the satisfaction of the Court—but, at minimum, we think the recent change of position should make the Court extremely wary of the government's explanation. And finally, of course, we think the government was correct in 1984 and 1985 when it insisted before Congress that the *McKay* defense was inappropriate—and that, for all of the traditional reasons upon which accountability in tort has historically been based, its military contractors should remain accountable for their tortious conduct.

II. ALTERNATIVELY, IF A "GOVERNMENT CONTRACTOR DEFENSE" IS TO BE RECOGNIZED IN SOME FORM, IT SHOULD BE FAR MORE NARROWLY DRAWN, AS IT HAS BEEN DRAWN BY THE ELEVENTH CIRCUIT.

As the Court is aware, the Eleventh Circuit disagreed with *McKay* and its progeny for a number of the reasons we have argued above, in *Shaw, supra*. And, although the *Shaw* Court recognized that it was the "raising of the defense, rather than the maintenance of the action itself" (778 F.2d at 743) which implicated the primary concern of the *McKay* Court, it chose not to disavow the defense altogether, as we have urged this Court to do above. Instead, to protect the type of design decisions which might

qualify as truly informed "military decisions", and to retain traditional accountability for negligent decisions actually made by civilian contractors, it adopted a form of the defense bottomed exclusively upon the "separation of powers doctrine". As we have explained above, we do not believe any form of the defense is either necessary or justified—but if the Court disagrees, we respectfully submit that the *Shaw* defense is far more principled than the *McKay* defense; that it appropriately preserves traditional accountability in tort and promotes safety where the contractor is the party at fault; that it appropriately protects truly "military decisions" from the scrutiny of the courts; and that it should be adopted here as the only acceptable alternative to the utter destruction of all of the traditional purposes and principles of tort law effected by *McKay* and its progeny. The Eleventh Circuit's opinion speaks eloquently enough for itself, so we are content simply to refer the Court to that opinion for our alternative position here.

CONCLUSION

The judgment of the lower court should be reversed.

Respectfully submitted,

JOEL D. EATON, ESQUIRE

(Counsel of Record)

ROBERT L. PARKS, ESQUIRE

PODHURST, ORSECK, PARKS, JOSEFSBERG,

EATON, MEADOW & OLIN, P.A.

800 City National Bank Building

25 West Flagler Street

Miami, Florida 33130

(305) 358-2800

Attorneys for Amicus Curiae

AMICUS CURIAE

BRIEF

MOTION
MAY 18 1987

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No. 86-492

In the Supreme Court of the United States

October Term, 1986

DELBERT BOYLE, personal representative of the
Heirs and Estate of David A. Boyle, deceased,

Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

THIS BRIEF AMICUS CURIAE ON BEHALF OF BELL
HELICOPTER TEXTRON INC. IS FILED CONTINGENT UPON
THE COURT'S GRANTING THE FOLLOWING MOTION FOR
LEAVE TO FILE A BRIEF AMICUS CURIAE AND IS IN SUPPORT
OF RESPONDENT, UNITED TECHNOLOGIES CORP.

MOTION FOR LEAVE TO FILE BRIEF AMICUS CURIAE AND BRIEF AMICUS CURIAE ON BEHALF OF BELL HELICOPTER TEXTRON INC. IN SUPPORT OF RESPONDENT

BROWN, HERMAN, SCOTT
DEAN & MILES
R. DAVID BROILES*
Suite 203

Fort Worth Club Building
Fort Worth, Texas 76102
Telephone: (817) 332-1391

GEORGE GALERSTEIN
JAMES W. HUNT

Attorneys for
BELL HELICOPTER TEXTRON INC.

*Counsel of Record

i
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**MOTION FOR LEAVE TO FILE
BRIEF AMICUS CURIAE**

Bell Helicopter Textron Inc. ("Bell") respectfully moves for leave to file the accompanying Brief Amicus Curiae in this case pursuant to Rule 36.3 of the Rules of this Court. Attempts have been made to obtain consent from both petitioner and the respondent; however, such consent has been denied.

Bell has a substantial interest in this case arising from its position as defendant in a case in which it has asserted the military contractor defense which is now pending before this Court pursuant to Petition for Certiorari filed by plaintiff, *Dowd v. Textron Inc.*, 792 F.2d 409

(4th Cir. 1986) cert. pending No. 86-739, and its position as a major supplier of military aircraft to the United States Government, having supplied in excess of 15,000 helicopters for use by the various branches of the military over a period of 40 years. Approximately 80 percent of the helicopters in operation by the United States Army were manufactured by Bell.

Bell has been sued in both state and federal courts by members of the United States military and by civilians alleging that they were injured because of product liability design defects in military equipment manufactured by Bell in accord with specifications set forth in agreements with the United States military.

WHEREFORE, movant Bell Helicopter Textron Inc. respectfully requests that its motion for leave to file the annexed brief amicus curiae be granted.

Respectfully submitted,

R. DAVID BROILES
BROWN, HERMAN, SCOTT
DEAN & MILES
Suite 203
Fort Worth Club Bldg.
Fort Worth, Texas 76102

GEORGE GALERSTEIN
JAMES W. HUNT

Attorneys for
BELL HELICOPTER TEXTRON INC.

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BRIEF OF AMICUS CURIAE BELL HELICOPTER TEXTRON INC. IN SUPPORT OF RESPONDENT

INTEREST OF AMICUS CURIAE

The interest of Bell Helicopter Textron Inc. is set forth in its foregoing motion for leave to file a brief amicus curiae.

ISSUE PRESENTED

Can a defense contractor, which fulfills its obligations under a contract with the government for military equipment, be held liable for the breach of a consumer tort requirement that is inconsistent with the military contract requirements.

SUMMARY OF ARGUMENT

When a military procurement contract between the federal government and a defense contractor requires the defense contractor to produce a military product in a specified configuration, the contractor must comply with that requirement. Tort law, whether state or federal in source, which imposes civil liability on a contractor who has produced a product in the configuration contracted for by the military, would impose inconsistent obligations upon the contractor. The obligation of the contractor to produce the item as specified by the military takes precedence over any inconsistent tort law obligation.

State tort law, which imposes liability upon a manufacturer who produces the military product as required, is preempted by the Supremacy Clause of the Constitution, Article 6, clause 2. To the extent that state law conflicts with federally created obligations in the same area, state law is inapplicable. *Florida Lime & Avocado Growers, Inc. v. Paul*, 373 U.S. 132 (1963). Such a conflict arises when compliance with the obligations of both a federal contract and state law is an impossibility. *Hines v. Davidowitz*, 312 U.S. 52 (1941).

The selection and purchase of military equipment by the federal government is governed by that considerable body of federal law, consisting of statutes, executive orders and regulations, which incorporates policies, rules and procedures and establishes a comprehensive system for government procurement of military equipment. This body of federal law covers all phases of the procurement process, from the solicitation of bids for proposals to the making of the contract, through its administration and performance, to its completion or termination.

The military contract between the government and the defense contractor is one manner in which the Executive and Legislative Branches of the Government implement their constitutional powers in the field of national defense. A state, whether through legislative or judicial action, is preempted from passing or enforcing any law or imposing any duty that is inconsistent with the government's or the defense contractor's rights and duties under the contract.

In addition, the requirement that the judiciary provide a consistent application of the various constitutional, statutory, and regulatory enactments in the area of national defense requires a formulation of the military-contractor defense applicable to federal tort law actions. Federal tort law should not be interpreted to create obligations upon military contractors inconsistent with those created by the federal procurement contract.

ARGUMENT

Cases presently before the courts present diametrically opposing views concerning the duty of defense contractors to those injured while using military equipment. Plaintiffs take the position that, under concepts of traditional tort law, the defense contractor owes its primary duty to the user rather than to the military. Defense contractors maintain that their primary duty can only be owed to the military and that their duty to the user can only be to make the product as specified by the military.

The *Amicus Curiae* brief of the Association of Trial Lawyers of America enunciates the plaintiffs' position:

Fundamental principles of tort law require that consumers be protected from defective products by holding manufacturers liable for injuries caused by the product. (Brief, p. 3)

This position assumes that (a) military procurement is analogous to the purchase of civilian consumer products, and (b) the defense contractor owes to the person using military equipment the same duties owed to the person using civilian consumer products. These assumptions are inappropriate and inapplicable to procurement by the military of equipment for the national defense.

I.

TRADITIONAL DESIGN DEFECT PRINCIPLES OF TORT LAW ARE INAPPLICABLE TO PROCUREMENT OF MILITARY EQUIPMENT

A. Procurement of Military Equipment Is Not Analogous to the Purchase of Consumer Products.

Those familiar with procurement by the military from defense contractors would not seriously contend that such procurement is analogous to purchases by civilian consumers. In purchasing helicopters from Bell Helicopter, no civilian consumer dictates the configuration of a helicopter. No civilian consumer has a staff of hundreds of competent engineers in every technical discipline supervising, approving, disapproving, and selecting the configuration of the helicopter and its components. No civilian consumer holds regular meetings with this manufacturer at which the design of the helicopter is critiqued and design changes are mandated. No civilian consumer has control over the format and content of the operating and service manuals. No civilian consumer approves every drawing and process that the manufacturer employs in the manufacture of the helicopter. No civilian consumer has a staff of personnel at the manufacturer's plant overseeing its activities on a daily basis. Most importantly, civilian consumers do not promulgate the laws governing and giving effect to the procurement contract, they do not promulgate the regulations interpreting the contract and they do not establish the courts to adjudicate disputes under the contract. Unlike the civilian consumer, the military exercises all of the rights listed above. Indeed, unlike the civilian consumer, the federal government has the statutory authority to compel the manufacturer to

produce equipment for the national defense. Defense Production Act of 1950, 50 U.S.C. app. section 2157 (1982).

B. Defense Contractors Do Not Owe to the Person Using Military Equipment the Same Duties Owed to the Person Using Civilian Consumer Products.

The defense contractor cannot owe to the person using military equipment the same duty that a manufacturer owes to persons using civilian consumer products. In the procurement of military equipment for the national defense, the defense contractor's obligations are to the government. The decision as to what is appropriate equipment for use by the military in the national defense is not one left to the defense contractor, but is made by the military. That decision is contained in the procurement contract which incorporates the specifications as they have been developed by the military and the contractor, and which obligates the contractor to manufacture the equipment as specified.

In the design of military equipment, the safety of the user of the equipment may be, of necessity, secondary to the national defense function of the product. As an example, all aircraft manufacturers are capable of manufacturing and installing in military aircraft what are called energy attenuating seats. These seats provide added safety to the pilot, crew or passengers in the event of a crash. However, these seats weigh more than non-crashworthy seats. As a consequence, the aircraft with crashworthy seats can lift less weight, which means it can carry fewer servicemen or weapons to and from the battle scene. The military, and no one else, must decide whether adding extra weight to make the aircraft safer for the crew is more important than carrying additional

personnel and weapons with their obvious military advantages.

Is a helicopter that can carry fourteen anti-tank rockets and has energy attenuating seats "safer" than the same helicopter equipped with eighteen anti-tank rockets but without energy attenuating seats? In answering this question, one recognizes a significant difference between military and commercial procurement. The safety of a military product may be determined not so much by the likelihood of the pilot escaping injury from a crash as by the likelihood of the survival of the foot soldiers under attack from enemy tanks. These difficult decisions as to what is "safe" in a military product must be made by the military, which takes into account the military purpose of the equipment.

If, as the plaintiffs contend, the defense contractor has a duty to the ultimate user to make the product "safe" for his use, then the defense contractor should also have the right to produce the equipment as it sees fit. It is axiomatic that there can be no duty where there is no right. In the context of military procurement the defense contractor does not have the right to design the equipment in the configuration it prefers. The military makes the decision as to its requirements in equipping the armed forces. Its decision may be inconsistent with maximizing the safety of the product for the person using the equipment. If the military requirements specify the equipment be made in a certain configuration, the defense contractor does not have the right to make the product in another configuration, even though it might be safer for one using the equipment.

As noted by the Second Circuit in *In Re Agent Orange, Product Liability Litigation* MDL No. 381, ___ F.2d

— (2d Cir. 1987), Docket Nos. 85-6163, 85-6269, 85-6337:

Civilian judges and juries are not competent to weigh the cost of injuries caused by a product against the cost of avoidance in lost military efficiency. Such judgments involve the nation's geopolitical goals and choices among particular tactics, the need for particular technologies resulting therefrom, and the likely tactics, intentions, and risk-averseness of potential enemies.

II.

WHEN THE MILITARY CONTRACTOR DEFENSE IS MET, THE DEFENSE CONTRACTOR IS NOT LIABLE UNDER FEDERAL OR STATE TORT LAW

Design defect cases involving military equipment have been brought in both state and federal courts asserting state or federal tort law. To illustrate, the *McKay*, *Tozer* and *Shaw* cases were filed in federal courts and were governed by federal tort law (maritime and Death on the High Seas Act, 46 U.S.C. sections 761-767). *Boyle* and *Dowd* were filed in federal courts, based on diversity jurisdiction, and applied the state tort law of Virginia and Maryland.¹ Many cases against military contractors

¹ *McKay v. Rockwell International Corporation*, 704 F.2d 444 (9th Cir. 1983) cert. denied, 464 U.S. 1043 (1984); *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986), petition for cert. filed, 55 U.S.L.W. 3337 (U.S. Oct. 23, 1986) (No. 86-674); *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985), petition for cert. filed, 54 U.S.L.W. 3632 (U.S. Mar. 17, 1986) (No. 85-1529); *Boyle v. United Technologies Corp.*, 792 F.2d 413 (4th Cir. 1986), cert. granted, — U.S. —, 107 S. Ct. 872 (1987) (No. 86-492); and *Dowd v. Textron Inc.*, 792 F.2d 409 (4th Cir. 1986), petition for cert. filed, 55 U.S.L.W. 3337 (U.S. Oct. 23, 1986) (No. 86-674).

have been filed in state courts and have applied state tort law.

The issue before this Court is the extent to which state or federal tort duties can be imposed on the manufacturer of military products when those duties are inconsistent with the manufacturer's duties as contained in the military procurement contract. The rule this Court should pronounce is that when a military procurement contract requires the manufacturer to produce military equipment in accord with approved specifications, and the manufacturer complies and has informed the military of risks known to it and not to the military, the manufacturer is shielded from liability for injuries caused by the equipment, and there can be no tort law obligation, state or federal, imposed on the manufacturer inconsistent with the contractual obligation.

A. Preemption of State Tort Law

In those cases alleging design defects and based on state tort law, the state law is preempted by federal law, and there can be no liability when the defense contractor has complied with the requirements of a federal contract which contains agreed specifications for the production of the military product. The constitutional preemption doctrine, based on the Supremacy Clause, applies when the federal government enters into a contract with a defense contractor to supply military equipment of a specified design.

Assume the legislature of the State of Texas were to pass a statute requiring that all jeeps manufactured in the State incorporate rollover bars. Rollover bars provide an additional degree of safety in the event a jeep turns over. Assume further the United States Army has decided, as reflected in its contract with a Texas

jeep manufacturer, that the jeeps it will purchase will not have rollover bars. Must the manufacturer provide the jeeps with rollover bars as required by the statute? Clearly not. The contractor must produce the military product pursuant to the contractual specifications, state law to the contrary notwithstanding. The state statutory requirement is preempted by the federal government requirement.²

Contracts between the United States and defense contractor are governed by uniform federal law including applicable federal statutes and regulations. *See United States v. Allegheny County*, 322 U.S. 174 (1944) and *United States v. Seckinger*, 397 U.S. 203 (1970). These contracts are governed by federal procurement law having its source in the Constitution, the Armed Services Procurement Act, 10 U.S.C. sections 2301-2314 (1982), the Defense Acquisition Regulations, 32 C.F.R. Ch. I, Parts 1 to 39, the Federal Acquisition Regulations, 48 C.F.R. Parts 1-4 (1986) and the abundant case law which has developed under this Act and regulations.

This body of federal law establishes particular rules appropriate only to contracts involving the federal government and "covers all phases of that process — from the solicitation of bids for proposals, to the making of the contract, through its administration and performance, to its completion or termination." *G. L. Christian v. United States*, 320 F.2d 345, 348 (Ct. Cl.

²A state common law requirement for the installation of roll bars is likewise preempted. Several courts ruling on attempts to impose liability under state common law on manufacturers who did not install roll bars have properly precluded recovery because of the military contractor defense. *See Sanner v. Ford*, 154 N.J. Super. 407, 381 A.2d 805 (N.J. App. Div. 1977); *Tillett v. J. I. Case Co.*, 756 F.2d 591 (7th Cir. 1985).

1963). United States procurement regulations prescribe standard contractual clauses which the United States includes in its agreements with private contractors for purchase of equipment. Questions as to the interpretation of these standard government clauses are heard by Board of Contract Appeals. The rights and duties of the parties to a government contract derive principally from the standard clauses required by regulation to be included in the contract. Federal procurement regulations have the "full force and effect of federal law, even to the extent of overriding inconsistent state legislation". *G. L. Christian v. United States*, 320 F.2d at 347.³

Public Utilities Comm'n v. United States, 355 U.S. 534 (1958), illustrates that a federal contract preempts state law which attempts to impose obligations inconsistent with the federal contract. California regulated the rates common carriers could charge for transporting property in the state. The United States negotiated special agreements with common carriers providing rates for transporting military property in California. The contracted for rates were negotiated under federal procurement law, which "... entrusted the procurement officers with the discretion to determine when existing rates will be accepted and when negotiations for lower rates will be undertaken". *Public Utilities Comm'n*, 355 U.S. at 543. The issue was whether common carriers could transport goods at lower rates established in contracts with the military, or must abide

³*Paul v. United States*, 371 U.S. 245 (1963); *Chicago & N.W. Tr. Co. v. KALO Brick & Tile*, 450 U.S. 311 (1981) [tort law]; *Leslie Miller, Inc. v. Arkansas*, 352 U.S. 187 (1956) [criminal law]; and *Operating Engineers v. Jones*, 460 U.S. 669 (1983) [tort law] are relevant examples of federally created obligations preempting inconsistent state law requirements.

by the higher rates set by the State Commission. In concluding that the state could not restrain or control the exercise of military contracting discretion, the Court held:

Here, however, the State places a prohibition on the Federal Government. Here the conflict between the federal policy of negotiated rates and the state policy of regulation of negotiated rates seems to us to be clear. The conflict is as plain as it was in *Arizona v. California*, 283 U.S. 423, 451, 75 L. Ed. 1154, 1163, 51 S. Ct. 522, where a State sought authority over plans and specifications for a federal dam, in *Leslie Miller, Inc. v. Arkansas*, 352 U.S. 187, 1 L. Ed. 2d 231, 77 S. Ct. 257, *supra*, where state standards regulating contractors conflicted with federal standards for those contractors, and in *Johnson v. Maryland*, 254 U.S. 51, 65 L. Ed. 126, 41 S. Ct. 16, where a State sought to exact a license requirement from a federal employee driving a mail truck. The conflict seems to us to be as clear as any that the Supremacy Clause, Art. 5, cl. 2, [sic] of the Consitution was designed to resolve. As Chief Justice Marshall said in *M'Culloch v. Maryland* (U.S.) 4 Wheat. 316, 427, 4 L. Ed. 579, 606, "It is of the very essence of supremacy to remove all obstacles to its action within its own sphere, and so to modify every power vested in subordinate governments, as to exempt its own operations from their own influence." 355 U.S. at 476-77.

No state, either through its legislative enactments or common law doctrines, can dictate the configuration

of a military product to be procured for national defense by the federal government.

B. The Military Contractor Defense is Applicable in Federal Tort Cases

Numerous federal court lawsuits against military contractors have been filed under federal tort law, particularly under federal maritime law and the Death on the High Seas Act. In accepting the military contractor defense, federal courts have emphasized federal constitutional, statutory, regulatory and common law bases for this defense. For example, in *McKay*, 704 F.2d at 444, the Ninth Circuit emphasized that contractors should not be held responsible for military decisions, and should therefore share the government immunity from tort liability to servicemen injured by alleged design defects in military equipment. In *Tozer*, 792 F.2d 403, *petition for cert. filed*, 55 U.S.L.W. 3337 (U.S. Oct. 23, 1986) (No. 86-674), the Fourth Circuit emphasized the separation of powers doctrine in restricting federal tort recovery because to do so would involve second-guessing the military. In *Bynum v. FMC Corp.*, 770 F.2d 556, 569 (5th Cir. 1985), although considering state tort law, the court emphasized that the defense was justified because "... any interference with the federal authority over national defense and military affairs implicates uniquely federal interests of the most basic sort." In *Koutsoubos v. Boeing Vertol*, 755 F.2d 352 (3d Cir. 1985), *cert. denied*, ___ U.S. ___, 106 S. Ct. 72 (1985), the court recognized that military contractors are unable to negotiate different design specifications than the military desires.

These policy considerations, taken together, all support the establishment of a defense by the federal courts to the tort liability of a military contractor who has complied with its military contract obligations. This

judicially fashioned defense harmonizes the broad injunctions of the Constitution, federal statutes, regulations and contracts.

III.

THE ELEMENTS OF THE MILITARY CONTRACTOR DEFENSE

The military contractor defense bars tort recovery when the contractor has manufactured the product as required by a federal contract. To accomplish this end, the test for the military contractor defense should comprise the following three elements:

1. Does the agreement for the procurement of military equipment require the contractor to manufacture the equipment in the configuration alleged to be defective?
2. Did the equipment as manufactured conform to that configuration?
3. Did the contractor inform the government of those dangers in the configuration which were known to the contractor and not known to the government?

This test does not require that the person injured when using military equipment be a member of the armed services. The defense contractor is not relieved of his obligation to manufacture the equipment as specified in the contract because a claim may ultimately be filed by a civilian instead of a serviceman. Those important policy reasons set forth by the various courts in adopting the military contractor defense fully apply regardless of the nature of the claimant. The equipment is designed for circumstances of warfare and is not designed with civilians in mind. The identity of an injured party is determined by the way in which the military decides

to use the equipment, a decision which cannot be controlled by the original manufacturer. There is no plausible reason why the claimant's lack of military status should deprive the defense contractor of the protection and the benefit of the military contractor defense when the contractor has manufactured the equipment as required by the military.⁴

The opportunities for design changes, restrictions on operation, warnings, and the like, that might be available to the manufacturer in order to minimize risks or enhance safety, as safety might be normally understood when the helicopter is in civilian use, are simply not available to the defense contractor. This is not an insignificant consideration. From 1979 to date, in lawsuits involving helicopters manufactured for the military by this defense contractor in accord with specifications set forth in contracts with the Army or the Navy, twenty-nine percent of the claims were for injury or death to civilians.

⁴The Second and Third Circuits have adopted a three prong test for the military contractor defense which does not distinguish between servicemen and civilians. See *Koutsoubous v. Boeing Vertol*, 755 F.2d 352 (3d Cir.) cert. denied, ___ U.S. ___, 106 S. Ct. 72 (1985), and *In Re "Agent Orange" Product Liability Litigation*, MDL No. 381, ___ F.2d ___ (2d Cir. 1987), Docket Nos. 85-6163, 85-6269, 85-6337.

The State of Washington has codified its version of the military contractor defense, which provides:

When the injury-causing aspect of the product was, at the time of manufacture, in compliance with a specific mandatory government contract specification relating to design or warnings, this compliance shall be an absolute defense. Wash. Rev. Code section 7.72.050(2).

This formulation is consistent with the position asserted in this Brief in that it does not include the requirement that a claimant be a serviceman and the government be immune, and centers the defense on proof of compliance with a contract obligation.

1. **First Element: Does the agreement for procurement of military equipment require the contractor to manufacture the equipment in the configuration alleged to be defective?**

The military equipment must have been manufactured under a contract which obligated the contractor to manufacture the product in a specified configuration, including the contractual requirement to produce the product in the configuration the plaintiff alleges to be defective. The meaning of the contract and its requirements is a question of contract interpretation to be made by the court. Thus, whether this element is met would be determined by the court and does not present a jury issue.

Using the *Boyle* case as an example, if the contract did not specify the location of the co-pilot's collective stick, a state law requirement that it be placed in a "safe" location would apply and the military contractor defense would not apply. On the other hand, if the federal contract specified that Sikorsky put the co-pilot collective stick on the co-pilot's left side, as Sikorsky did, then the first element of the military contractor defense would have been met.

Proponents of the *Shaw* test seek to predicate liability upon an historical inquiry as to who originally designed the alleged defective component. This approach ignores the obligation of the contractor to manufacture the product as specified by the contract. The issue is not who originally designed the component but whether the military selected that component for its military procurement. The selection by the military is usually contained in the contract documents and the specifi-

cations and drawings incorporated therein.⁵ The contractor must produce the product as specified, regardless of the contractor's role in the original design of the product. In *Hickman Sea Sled Co.*, 57-1 BCA, 3189 (1957), and *E. L. Cournard & Co., Inc.*, 60-2 BCA 14 (1960), the Board of Contract Appeals held that a contractor is not liable to the government for design defects in a product that it manufactured in accord with the specifications of its contract with the government, even though it had originally designed the product.

The irrelevance of the identity of the original designer of the equipment is also illustrated in the case of *Dowd v. Textron Inc.*, 792 F.2d at 409, presently pending before this Court pursuant to Petition for Certiorari. Respondent, Bell Helicopter had designed the allegedly defective rotor system in the 1960's. As the Fourth Circuit noted, "[t]he Army had been using helicopters equipped with [this] rotor system for some twenty years" before the accident and the Army's decision in 1978 to contract with Bell for installation of that rotor system was therefore made "in an atmosphere of awareness and in the light of experience." 792 F.2d at 412. It matters not one iota whether Bell, Sikorsky, or any other entity might have originally designed the allegedly defective rotor system. The significant issue, as recognized by the Fourth Circuit, is whether the Army, performing its constitutional function in the field of national defense, selected that rotor system for installation by Bell in 1978.

⁵Selection and approval of configuration may also be evidenced by identification by the military of a product that it has previously used, or by inspection and approval of a prototype or sample.

Plaintiffs' attorneys, while possibly recognizing that military contractors are required to manufacture the equipment as specified in the contract, contend the contractor is not required to enter into that contract. This does not reflect the reality of military contracting. The government has the authority to require production of military equipment for the national defense, Defense Production Act of 1950, 50 U.S.C. app. section 2157 (1982). The contractor cannot refuse to manufacture equipment the government requires.

While it may be argued that the defense contractor knows its products, its expertise is limited to the product alone and does not begin to encompass the spectrum of military, political, fiscal, and diplomatic considerations weighed by the military in its choice of equipment for the national defense. All the contractor can do is to inform the military of those dangers in the configuration of its equipment of which it is aware and the military is not aware. Legality aside, the defense contractor should not be placed in the position where it must refuse to manufacture equipment in the configuration identified by the military because it would not manufacture the equipment in that configuration for civilian use. This defense contractor recognizes from practical experience over many years that the configurations it may recommend for military use are not always configurations that the military considers best for its purposes.

2. Second Element: Did the equipment as manufactured conform to that configuration?

This element represents duties owed by the manufacturer to both the military and the user of the product. While the manufacturer's primary duty is to the government to manufacture the equipment as specified, there is a secondary duty to the user. If the product was manufactured as specified, that duty is satisfied and the second element is met. If the product is not manufactured as specified, that duty is not satisfied and the second element is not met. Accordingly, one injured because of a manufacturing defect (as distinguished from a design defect) may recover against the manufacturer under applicable state or federal tort law.

3. Third Element: Did the contractor inform the government of those dangers in the configuration which were known to the contractor and not known to the government?

The manufacturer should not be able to rely upon compliance with the contractual specification for a product if the government entered into the contract in ignorance of a danger which was known to the manufacturer. The duty of both the contractor and government to share information in entering into a contract is recognized in federal procurement law. Failure to inform the government of a danger known to the contractor but not to the government would vitiate the contract specification upon which the contractor seeks to rely. While the relationship between the contractor and government is not that of a fiduciary, there is a recognized obligation to share vital information so as not to betray the other party "into a ruinous course of action by silence . . .". *Helene Curtis Industries, Inc. v. United States*, 312 F.2d 774, 778 (Ct. Cl. 1963).

If the government and contractor both have knowledge of the danger in a design, it is immaterial from what source the government obtained the knowledge. See *Bailey & Assoc. v. United States*, 449 F.2d 376 (Ct. Cl. 1971) and *Piasecki Aircraft Corp.*, ASBCA No. 18783 (1977).

CONCLUSION

This court should establish the military contractor defense as bar to tort claims based on federal or state law, shielding a military contractor from liability for injuries caused by equipment manufactured for the military, so long as the product is manufactured as specified and the contractor has informed the government of dangers known to the contractor and not to the government.

Respectfully submitted,

R. David Broiles
BROWN, HERMAN, SCOTT
DEAN & MILES
Suite 203
Fort Worth Club Bldg.
Fort Worth, TX 76102

GEORGE GALERSTEIN
JAMES W. HUNT

Attorneys for
BELL HELICOPTER TEXTRON INC.

PROOF OF SERVICE BY MAIL

State of California

ss.

County of Los Angeles

I, the undersigned, say: I am and was at all times herein mentioned, a citizen of the United States and a resident of the County of Los Angeles, over the age of eighteen (18) years and not a party to the within action or proceeding; that my business address is 725 South Figueroa Street, Los Angeles, California 90017; that on May 18, 1987, I served the within *Motion for Leave to File Brief Amicus Curiae* and *Brief Amicus Curiae* in said action or proceeding by depositing true copies thereof, enclosed in a sealed envelope with postage thereon fully prepaid, in the United States mail at Los Angeles, California, addressed as follows:

Clerk, United States
Supreme Court
One First Street, N.W.
Washington, D.C. 20543
(Hand delivered: original
and forty copies)

Louis S. Franecke, Esq.
MACK, HAZELWOOD,
FRANECKE & TINNEY
221 Pine Street
Suite 600
San Francisco,
California 94104

Dale Haralson, Esq.
HARALSON, KINERK &
MOREY
82 South Stone Avenue
Tucson, Arizona 85701

Michael J. Pangia, Esq.
SMILEY, OLSON, GILMAN &
PANGIA
1815 H Street N.W.
Suite 600
Washington, D.C. 20006

Lewis T. Booker, Esq.
HUNTON & WILLIAMS
707 East Main
Box 1535
Richmond, Virginia 23212

Kenneth S. Geller, Esq.
MAYER, BROWN & PLATT
2000 Pennsylvania Ave. N.W.
Washington, D.C. 20006

James M. Fitzsimons, Esq.
MENDES & MOUNT
725 S. Figueroa Street
Nineteenth Floor
Los Angeles, California 90017

Joel D. Eaton, Esq.
PODHURST, ORSECK,
PARKS, JOSEFSBERG,
MEADOW, OLIN
800 City National
Bank Building
25 W. Flagler Street
Miami, Florida 33130

I declare under penalty of perjury that the foregoing
is true and correct. Executed on May 18, 1987, at Los
Angeles, California.

Mark L. Cwern
(Original signed)

AMICUS CURIAE

BRIEF

MOTION FILED
MAY 21 1987

No. 86-492

IN THE
Supreme Court of the United States
OCTOBER TERM, 1986

DELBERT BOYLE, as Personal Representative of
the Heirs and Estate of David A. Boyle, deceased,
v. *Petitioner,*

UNITED TECHNOLOGIES CORPORATION,
Respondent.

On Writ of Certiorari to the
United States Court of Appeals
for the Fourth Circuit

**MOTION FOR LEAVE TO FILE BRIEF *AMICUS CURIAE*
AND
BRIEF *AMICUS CURIAE* OF UNR INDUSTRIES, INC.
IN SUPPORT OF RESPONDENT
UNITED TECHNOLOGIES CORPORATION**

JOE G. HOLLINGSWORTH
SPRIGGS, BODE & HOLLINGSWORTH
1015 Fifteenth Street, N.W.
Washington, D.C. 20005
(202) 898-5800
*Counsel of Record for
Amicus Curiae
UNR Industries, Inc.*

Of Counsel

DONALD W. FOWLER
SPRIGGS, BODE & HOLLINGSWORTH
1015 Fifteenth Street, N.W.
Washington, D.C. 20005
(202) 898-5800

May 21, 1987

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Respondent.

On Writ of Certiorari to the
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**MOTION OF UNR INDUSTRIES, INC. FOR
LEAVE TO FILE BRIEF *AMICUS CURIAE* IN
SUPPORT OF RESPONDENT
UNITED TECHNOLOGIES CORPORATION**

UNR Industries, Inc. ("UNR") hereby respectfully moves the Court, pursuant to Rule 36.3, for leave to file the enclosed brief *amicus curiae* in support of respondent United Technologies Corporation. UNR has requested, but was refused, the consent of the parties to its filing the enclosed brief.

In support of its motion, UNR states as follows:

1. Between 1935 and 1972, UNR manufactured and supplied to the United States Navy (and other federal agencies, including the War Production Board) certain thermal-insulation products for use in the construction and repair of United States naval vessels during and after World War II. Throughout that period, UNR manufactured—and the Navy procured—those strategi-

cally critical products pursuant to federal procurement contracts which incorporated and mandated compliance with Navy (and, later, military) specifications. Those specifications—which governed the design, content, manufacture, testing and packaging of the products—affirmatively mandated the use of asbestos as a principal ingredient in those products. Throughout the relevant period, UNR complied strictly with every detail of those governing specifications.

2. As a result of its compliance with the Navy's tremendous demand for asbestos-containing insulation products throughout and following World War II, UNR has been named a defendant in thousands of personal-injury lawsuits brought by military and civilian workers exposed to asbestos in the course of their employment at United States naval and government-contract shipyards throughout the country. In appropriate cases, UNR has asserted the government contract specification defense as a defense to such claims. Its assertion of that defense is based upon the fact that (i) it manufactured and sold the allegedly harmful products in question pursuant to federal military procurement contracts; (ii) it manufactured and sold the allegedly harmful products in strict compliance with federally promulgated and enforced design specifications which governed every aspect of the products' design, content, manufacture, testing and packaging; and (iii) throughout the relevant period, the United States possessed (and concealed from UNR) extensive knowledge of the dangers of occupational exposure to airborne asbestos dust, which knowledge far exceeded any such knowledge ever possessed by UNR. No court has yet ruled on the merits of UNR's assertion of the government contract specification defense.

3. In the case now pending before this Court, the United States Court of Appeals for the Fourth Circuit upheld the defendant's (respondent's) assertion of a so-called "military contractor defense," the elements of which the court of appeals articulated as follows:

A military contractor can escape liability for a design defect if it can demonstrate that 1) the United States is immune from liability; 2) the United States approved reasonably precise specifications for the equipment; 3) the equipment conformed to those specifications; and 4) the supplier warned the United States about dangers in the use of the equipment that were known to the supplier but not to the United States.

Boyle v. United Technologies Corp., 792 F.2d 413, 414 (4th Cir. 1986) (Pet. App. at A5-A6).

4. UNR agrees that the respondent United Technologies Corporation was properly afforded the protection of the government contract specification defense in the instant litigation. It strenuously objects, however, to the lower court's incorporation of an additional element into its statement of the elements of that defense. Specifically, it submits that a government contractor (and particularly a military contractor) which faithfully and innocently complies with the requirements of detailed government specifications should not be required to show that "the United States is immune from liability" in order to assert entitlement to the protection of the government contract specification defense. The court's reference to immunity on the part of the United States would apparently limit application of the defense to situations where the injured plaintiff was a member of the United States armed services and the United States is immune from suit by virtue of this Court's decisions in *Feres v. United States*, 340 U.S. 135 (1950), and *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666 (1977). See Brief for the United States as *Amicus Curiae*, at 10-15, *Grumman Aerospace Corp. v. Shaw*, No. 85-1529 (filed Nov. 25, 1986).

5. UNR seeks to file the enclosed brief *amicus curiae* in order to demonstrate (i) that there is no principled basis on which to limit application of the government contract specification defense to situations in which the

United States is immune from suit under the *Feres-Stencel* doctrine; (ii) that the constitutional separation of powers forecloses judicial second-guessing of informed strategic military decisions irrespective of whether individuals harmed thereby were military or civilian employees of the United States; and (iii) that it would be profoundly anomalous if a military contractor could be held liable to civilian employees of the United States military while being shielded from liability for injuries—inflicted by precisely the same military decisions—to those federal employees' military-service counterparts engaged in essentially the same governmental services.

FOR THESE REASONS, and because this Court's ruling in the instant case could materially affect UNR's rights in pending litigation, UNR respectfully submits that it should be permitted now to file the brief *amicus curiae* enclosed herewith.

Respectfully submitted,

JOE G. HOLLINGSWORTH
 SPRIGGS, BODE & HOLLINGSWORTH
 1015 Fifteenth Street, N.W.
 Washington, D.C. 20005
 (202) 898-5800
Counsel of Record for
Amicus Curiae
UNR Industries, Inc.

Of Counsel

DONALD W. FOWLER
 SPRIGGS, BODE & HOLLINGSWORTH
 1015 Fifteenth Street, N.W.
 Washington, D.C. 20005
 (202) 898-5800

May 21, 1987

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IN THE
Supreme Court of the United States

OCTOBER TERM, 1986

 No. 86-492

DELBERT BOYLE, as Personal Representative of
the Heirs and Estate of David A. Boyle, deceased,
v. *Petitioner*,

UNITED TECHNOLOGIES CORPORATION,
Respondent.

On Writ of Certiorari to the
United States Court of Appeals
for the Fourth Circuit

BRIEF *AMICUS CURIAE* OF UNR INDUSTRIES, INC.
IN SUPPORT OF RESPONDENT
UNITED TECHNOLOGIES CORPORATION

INTRODUCTION

The government contract specification defense is an absolute defense to product-liability claims against government-contract manufacturers, where:

1. The Government established and contractually enforced specifications pursuant to which the allegedly injurious product was manufactured and procured;
2. The product complied with the Government's specifications in all material respects; and

3. The Government possessed knowledge concerning hazards associated with the use of the product which was greater than or equal to that of the manufacturer. See *Burgess v. Colorado Serum Co.*, 772 F.2d 844 (11th Cir. 1985) (applying Alabama law); *In re Air Crash Disaster at Mannheim Germany*, 769 F.2d 115 (3d Cir. 1985), cert. denied sub. nom., *Eschler v. Boeing Co.*, 479 U.S. —, 106 S. Ct. 851, 84 L.Ed.2d 432 (1986) (applying Pennsylvania law); *Koutsoubos v. Boeing Vertol*, 755 F.2d 352 (3d Cir. 1982) — U.S. —, 106 S. Ct. 72, 88 L.Ed.2d 59 (1985) (applying federal common law); *In re "Agent Orange" Product Liability Litigation*, 597 F. Supp. 740 (E.D.N.Y. 1984), aff'd, No. 85-6163 (2d Cir. April 21, 1987) ("*Agent Orange III*") (federal common law); *In re "Agent Orange" Product Liability Litigation*, 534 F. Supp. 1046 (E.D.N.Y. 1982), cert. denied, 465 U.S. 1067 (1984) ("*Agent Orange II*") (same); *In re "Agent Orange" Product Liability Litigation*, 506 F. Supp. 762 (E.D.N.Y.), rev'd on other grounds, 635 F.2d 987 (2d Cir. 1980), cert. denied, 465 U.S. 1067 (1984) ("*Agent Orange I*") (same).

The overwhelming weight of authority¹ and compelling public policy considerations—founded in the doctrine of

¹ See, e.g., *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986), cert. pending (No. 86-674) (filed Oct. 23, 1986) (manufacturer of defective airplane part relieved from liability, under any theory, where manufacturer fully complied with government specifications and did not fail to notify government of dangers unknown to government); *Dowd v. Textron, Inc.*, 792 F.2d 409 (4th Cir. 1986), cert. pending (No. 86-379) (filed Sept. 6, 1986) (manufacturer of defective helicopter rotor system not liable where manufacturer modified the rotor design under direction of the Navy); *Burgess v. Colorado Serum Co.*, 772 F.2d 844 (11th Cir. 1985) (manufacturer of brucellosis vaccine not liable to injured veterinarian where vaccine was produced pursuant to detailed government specifications); *Bynum v. FMC Corp.*, 770 F.2d 556 (5th Cir. 1985) (manufacture of cargo carrier in compliance with government specifications shields contractor from negligence, breach of warranty and strict liability claims); *In re Air Crash Disaster at Mannheim Germany*,

separation of powers, the need for orderly and rational government procurement, and basic notions of fairness—support the adoption and application of the government

769 F.2d 115 (3d Cir. 1985), cert. denied sub. nom., *Eschler v. Boeing Co.*, 479 U.S. —, 106 S. Ct. 851, 84 L.Ed.2d 432 (1986) (manufacturer relieved from liability where it followed government design specifications and no design modifications could be made without prior government review and testing); *Tillett v. J.I. Case Co.*, 756 F.2d 591 (7th Cir. 1985) (manufacturer relieved from liability where commercial product was inspected and approved by the government); *Koutsoubos v. Boeing Vertol*, 755 F.2d 352 (3d Cir. 1985), aff'd 553 F. Supp. 340 (E.D. Pa. 1982), cert. denied, — U.S. —, 106 S. Ct. 72, 88 L.Ed.2d 59 (1985) (manufacturer of defectively designed helicopter absolved from liability in strict liability and negligence by virtue of compliance with government specifications); *Brown v. Caterpillar Tractor Co.*, 741 F.2d 656 (3d Cir. 1984) (manufacture of bulldozer in accordance with government contract specifications provides a complete defense to personal injury claims based on failure to include safety device, whether phrased in negligence, strict liability, or breach of warranty); *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), cert. denied, 464 U.S. 1043 (1984) (strict liability claims for injuries sustained as a result of defectively designed aircraft ejection system defeated by manufacturer's compliance with government-approved specifications); *Myers v. United States*, 323 F.2d 580 (9th Cir. 1963) (compliance with government specifications defeats tort action arising out of faulty road construction); *In re "Agent Orange" Product Liability Litigation*, 597 F. Supp. 740 (E.D.N.Y. 1984), aff'd, No. 85-6163 (2d Cir. April 21, 1987) ("*Agent Orange III*") ; *In re "Agent Orange" Product Liability Litigation*, 534 F. Supp. 1046, 1054 n.1 (E.D.N.Y. 1982) ("*Agent Orange II*") ; *In re "Agent Orange" Product Liability Litigation*, 506 F. Supp. 762 (E.D.N.Y.), rev'd on other grounds, 635 F.2d 987 (2d Cir. 1980) ("*Agent Orange I*") (suppliers of chemical defoliant not liable for injuries where manufacturers complied with government specifications and did not conceal knowledge of hazards from the government); *Green v. ICI America, Inc.*, 362 F. Supp. 1263 (E.D. Tenn. 1973) (contractor not liable for nuisance created by operation of plant in accordance with government specifications); *Littlehale v. E.I. duPont de Nemours & Co.*, 268 F. Supp. 791, 803-04 n.17 (S.D.N.Y. 1966), aff'd, 380 F.2d 274 (2d Cir. 1967) (compliance with military specifications, which did not require warnings, absolves manufacturer of liability for prematurely exploding detona-

contract specification defense in those government-procurement circumstances defined by the elements of the defense as stated above.

INTEREST OF AMICUS CURIAE

As indicated in the accompanying motion for leave to file this brief *amicus curiae*, UNR has been sued by thousands of federal and government-contract shipyard workers—military and civilian alike—allegedly injured as the result of the informed and conscious decisions of the United States Navy (and other federal agencies) to require the use of asbestos in all thermal-insulation products used aboard United States naval and merchant vessels over a period of more than 40 years.

Under the formulation of the “military contractor defense” articulated by the court of appeals in the instant

tor caps); *Dolphin Gardens, Inc. v. United States*, 243 F. Supp. 824 (D. Conn. 1965) (suit for damages resulting from fumes from improperly placed dredge soil barred by contractor's compliance with government plans); *McLaughlin v. Sikorsky Aircraft*, 148 Cal. App. 3d 203, 195 Cal. Rptr. 764 (1983) (defense available to defeat strict liability claims); *Hunt v. Blasius*, 55 Ill. App. 2d 14, 370 N.E.2d 617 (1977), *aff'd*, 74 Ill. 2d 203, 384 N.E.2d 368 (1978) (compliance with government specifications insulates contractor from liability for allegedly unsafe highway signposts); *McCabe Powers Body Co. v. Sharp*, 594 S.W.2d 592 (Ky. 1980) (manufacturer not liable for injuries caused by defective design and failure to warn where aerial boom was manufactured in compliance with government specifications); *Sanner v. Ford Motor Co.*, 144 N.J. Super. 1, 364 A.2d 43 (Law Div. 1976), *aff'd*, 154 N.J. Super. 407, 381 A.2d 805 (App. Div. 1977), *cert. denied*, 75 N.J. 616, 384 A.2d 846 (1978) (adherence to military specifications shields manufacturer from liability for defectively designed jeeps); *Casabianca v. Casabianca*, 104 Misc. 2d 348, 428 N.Y.S. 2d 400 (Sup. Ct. Bronx Cty. 1980) (manufacturer not liable for defective dough-making machine supplied pursuant to military specifications); *Valley Forge Gardens, Inc. v. James D. Morrissey, Inc.*, 385 Pa. 477, 123 A.2d 888 (1956) (contractor immune from liability where work was performed in accordance with government plans and specifications).

litigation, UNR would (i) be *protected* against any tort claims asserted against it by injured *military* personnel and, yet, (ii) potentially be exposed to virtually limitless liability to *identically situated federal and government-contract civilian employees on the basis of identical tort claims*.

It is therefore critically important to UNR that this Court either (i) rule that the “military contractor defense” is available, in appropriate circumstances, irrespective of whether the United States is itself immune from direct suit by virtue of the so-called *Feres-Stencel* doctrine; or (ii) expressly limit its discussion of the “military contractor defense” to the facts of the case, making it clear that it has not been called upon to rule (and that it does not here rule) on the general availability *vel non* of the government contract specification defense discussed in this brief. UNR urgently makes this request to avoid the inadvertent diminution of its rights in its own pending litigation. See generally Motion of UNR Industries, Inc. for Leave to File Brief *Amicus Curiae* in Support of Defendant United Technologies Corporation, *supra*.

SUMMARY OF ARGUMENT

The government contract specification defense is a well-established and widely-recognized legal defense available to defeat tort claims of persons allegedly injured as a result of design defects in products manufactured pursuant to government procurement contracts and in compliance with mandatory government contract specifications. The defense, which is founded in constitutional separation of powers principles and notions of basic fairness, has been applied in military and civilian contexts alike, in a myriad of factual circumstances, without regard to whether the government was itself immune from direct suit by the injured party.

The suggestion that, when the procuring government agency is a branch of the United States military, an inno-

cent and fully complying contractor must, in order to enjoy the protection afforded by the defense, additionally demonstrate that the injured party was an active-duty member of the armed forces and that the United States therefore was immune by operation of the so-called *Feres-Stencel* doctrine, is logically and legally unfounded.

For all the reasons stated herein, the Court should either (i) rule expressly that governmental immunity under the *Feres-Stencel* doctrine is *not* a legal prerequisite to the invocation of the government contract specification defense, or (ii) expressly state that it need not, and does not, address this issue in the instant litigation.

ARGUMENT

I. The Government Contract Specification Defense

The government contract specification defense derives from the established tort principle, recognized by the courts at least since 1924,² that an independent contractor is not liable to third parties injured as the result of his activities "if he has merely carried out carefully the plans, specifications and directions given him, since in that case the responsibility is assumed by the employer, at least where the plans are not so obviously defective and dangerous that no reasonable man would follow them." W. Prosser, *Law of Torts* § 104, at 681 (4th ed. 1971).³

² See *Ryan v. Feeney & Sheehan Bldg. Co.*, 239 N.Y. 43, 44, 145 N.E. 321, 321-22 (1924) ("A builder or contractor is justified in relying upon the plans and specifications which he has contracted to follow, unless they are so apparently defective that an ordinary builder of ordinary prudence would be put upon notice that the work was dangerous and likely to cause injury.").

³ See, e.g., *Garrison v. Rohm & Haas Co.*, 492 F.2d 346, 351-53 (6th Cir. 1974) (dismissing various claims, including strict liability claim of failure to warn, for injuries resulting from dolly manufactured pursuant to specifications prepared by plaintiff's employer); *Spangler v. Kranco, Inc.*, 481 F.2d 373, 375 (4th Cir.

This Court first recognized the government contract specification defense in *Yearsley v. W.A. Ross Construction Co.*, 309 U.S. 18 (1940), holding that a federal contractor was not liable for injuries to private property resulting from erosion caused by the contractor's construction of dikes in accordance with government plans. The same principle has been applied in a wide variety of cases to defeat tort claims, in both civilian and military contexts, for injuries resulting from a manufacturer's compliance with specifications issued by its customer.⁴

At the heart of the modern government contract specification defense is the realization that the imposition of tort liability upon a conscientious and innocent government contractor serves no societal purpose where the government itself is the decision-maker with respect to product design, content and manufacture:

[T]ort liability principles properly seek to impose liability on the wrongdoer whose act or omission caused the injury, not on the otherwise innocent contractor whose only role in causing the injury was the proper performance of a plan supplied by the government.

Agent Orange I, *supra*, 506 F. Supp. at 793. When the purchaser is a governmental entity, and the transaction involves formalized government procurement, additional policy considerations come to the fore. As an Illinois ap-

1973) (dismissing claims for injuries resulting from a crane manufactured in accordance with specifications provided by defendant's customer); *Orion Insurance Co. v. United Technologies Corp.*, 502 F. Supp. 173, 176 (E.D. Pa. 1980) (dismissing strict liability claim against a manufacturer of a helicopter component, based upon defective design and manufacture, on the ground that the manufacturer had produced the component in compliance with specifications issued by a third party); *Davis v. Henderlong Lumber Co.*, 221 F. Supp. 129, 124 (N.D. Ind. 1963) (dismissing claims against prime and subcontractor for plaintiff's exposure to toxic laboratory fumes on ground that laboratory had been constructed in compliance with plans furnished by plaintiff's employer).

⁴ See notes 1-3 *supra*.

pellate court succinctly explained in *Hunt v. Blasius*, *supra*:

A government contract must of necessity be different in nature from private undertakings. Nearly all government purchases and contracts are taken by open bidding; necessity exists to obtain the widest possible field of bidders in order to preserve tax revenues. Should bidders feel apprehensive that they might be sued for following specifications, either of two untoward results could ensue: (1) There would be no bids, or (2) bids would be inflated to take care of any potential liability. *Public policy dictates that bidders who comply strictly with governmental specifications should be shielded from liability in any respect in which the product complies.*

55 Ill. App. 3d at 20, 370 N.E.2d at 621-22 (emphasis added).

Additional, constitutionally based policy considerations come into play where, as here (and in UNR's litigation), the procuring governmental agency is a branch of the United States military:

[H]olding military contractors liable [for injuries caused by dangerous products designed by the military] would "thrust the judiciary into the making of military decisions. Although judges must decide cases from fields of endeavor of which they know little, their otherwise omniscience confronts its limits in military matters. At this point, it must be acknowledged, separation of powers becomes a proper concern."

Koutsoubos v. Boeing Vertol, *supra*, 755 F.2d at 354 (quoting *McKay v. Rockwell International Corp.*, 704 F.2d 444, 449 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984)). See also *In re "Agent Orange" Product Liability Litigation*, No. 85-6163 (2d Cir. April 21, 1987);⁵

⁵ The slip opinion of the United States Court of Appeals for the Second Circuit in the most recent *Agent Orange* decision is submitted herewith as an appendix.

In re Air Crash Disaster at Mannheim Germany, *supra*, 769 F.2d at 121; *Tillett v. J.I. Case Co.*, 756 F.2d 591 (7th Cir. 1985).⁶

In UNR's asbestos litigation, it has been alleged that the United States Navy (and other military agencies), fully apprised that exposure to asbestos presented a serious and immediate threat to the health and safety of shipyard workers, nonetheless determined that it was imperative that asbestos-containing insulation products be used in the construction and repair of this Nation's naval fleet. As the Court of Appeals for the Fourth Circuit has recently explained of such decisions by the military:

It should be axiomatic that "considerations of cost, time of production, risks to participants, risks to third parties, and any other factors that might weigh on the decisions of whether, when, and how to use a particular weapon, are uniquely questions for the military and are exempt from review by civilian courts."

Tozer v. LTV Corp., 792 F.2d 403, 406 (4th Cir. 1986) (quoting *Agent Orange II*, *supra*, 534 F. Supp. at 1054 n.1).

A related concern of compelling importance is the obvious public interest in assuring ready access by the military to materials which are perceived by the military to

⁶ The Courts of Appeals for both the Second and Fourth Circuits have articulated precisely the same rationale in upholding the defense:

[A]pplication [of the government contract specification defense] to military contractors, however, serves more than the historic purpose of not imposing liability on a contractor who has followed specifications required or approved by the United States government. It advances the separation of powers and safeguards the process of military procurement.

In re "Agent Orange" Product Liability Litigation, *supra*, slip opinion at 6 (appendix at 7a) (quoting *Tozer v. LTV Corp.*, 792 F.2d 403, 405 (4th Cir. 1986)).

be necessary to the national defense. The government contract specification defense, by immunizing the supplier from liability so long as he fully discloses any material information he possesses concerning the hazards of the product specifications, serves and advances that interest. Conversely, that compelling national interest is ill-served if a manufacturer, faced with uncertain liability as a consequence of supplying the requested product, must second-guess the military's specifications. Thus, as one New Jersey state court has observed:

The procurement of military equipment by the government is made pursuant to its war powers and its inherent right and obligation to maintain an adequate defense posture. In carrying out its responsibilities the government must be given wide latitude in its decision-making process.

To impose liability on a governmental contractor who strictly complies with the plans and specifications provided to it by the Army . . . would seriously impair the government's ability to formulate policy and make judgments pursuant to its war powers. The government is the agency charged with the responsibility of deciding the nature and type of military equipment that best suits its needs, not a manufacturer

Sanner v. Ford Motor Co., 144 N.J. Super. 1, 9, 364 A.2d 43, 47 (Law Div. 1976), *aff'd*, 154 N.J. Super. 407, 381 A.2d 805 (App. Div. 1977), *cert. denied*, 75 N.J. 616, 384 A.2d 846 (1978); *In re "Agent Orange" Product Liability Litigation*, *supra*, 534 F. Supp. at 1054 n.1; *Casabianca v. Casabianca*, 104 Misc. 2d 348, 350, 428 N.Y.S. 2d 400, 402 (Sup. Ct. Bronx Cty. 1980).

In *Casabianca*, a dough-mixing machine manufactured for the Army in the 1940's, in compliance with government specifications, came later to be owned by the proprietor of a pizza parlor in the Bronx. Some time in the late 1970's, the infant son of the pizza-parlor operator was severely injured when his hand was caught in the

machine's mixing blades. The child sued the machine's manufacturer, alleging negligence, breach of warranty and strict products liability. The manufacturer sought summary judgment on the basis of the government contract specification defense. The court dismissed all claims against the manufacturer, ruling that,

as a matter of public policy no such liability may be imposed. It is not disputed that the defendant Teledyne manufactured the machine in accordance with such specifications. A supplier to the military in time of war has a right to rely upon such specifications and is not obligated to withhold from the United States armed forces material believed by the latter to be necessary because the manufacturer considers the design to be imprudent or even dangerous.

104 Misc. 2d at 350, 428 N.Y.S.2d at 402.

Finally, underlying all of the policy interests which support application of the government contract specification defense in the circumstances presented here (and in UNR's litigation), is a fundamental recognition of the fact that "imposing enormous liability on a manufacturer who had been found to produce a product on the government's terms would be unfair." See Note, *Liability of a Manufacturer for Products Defectively Designed by the Government*, 23 B.C.L. Rev. 1025, 1072 (1982). The defense—which represents a carefully developed judicial accommodation of the important public policies outlined above with those which underlie strict liability principles in the context of government (and especially military) procurement—is designed "to accommodate [these] concerns of basic fairness." *Id.* at 1073.

Under the defense, a supplier has two obligations: First, it must comply carefully and fully with the government's contract specifications;⁷ second, it must apprise

⁷ Thus, the defense does not insulate a manufacturer from liability where it has failed to comply with the specifications (*i.e.*,

the government of any hazards, unknown to the government, associated with the product of which the supplier is aware and which might affect the government's decision to procure the product.⁸ Once this has been accomplished, the government is in a position to evaluate and weigh the risks and benefits which will attend its decision to proceed with the use of the product. Then, for all of the reasons set forth above, the supplier should not be held liable for its compliance with the government's demand for that product.

II. The *Feres-Stencel* Doctrine

The suggestion that a government contractor—and, particularly a military contractor—should be denied protection of the government contract specification defense whenever the party ultimately injured happens to be a civilian defies logic and ignores the many important public policy considerations which underlie the defense.

As noted above, the defense is ultimately founded in considerations of separation of powers. Particularly where the procuring agency is a branch of the United States military, permitting an injured third party—

where it has defectively manufactured the product). See, e.g., *Foster v. Day & Zimmerman, Inc.*, 502 F.2d 867 (8th Cir. 1974); *M.C. Winters, Inc. v. Eubank*, 456 S.W.2d 500 (Tex. Civ. App. 1970).

⁸ As the Court of Appeals for the Second Circuit stated in its recent *Agent Orange* decision:

Agent Orange was a product whose use required a balancing of the risk to friendly personnel against potential military advantage. That balancing was the exclusive responsibility of military professionals and their civilian superiors. The responsibility of the chemical companies was solely to advise the government of hazards known to them of which the government was unaware so that the balancing of risk against advantage was informed.

In re "Agent Orange" Product Liability Litigation, *supra*, slip opinion at 11 (appendix at 11a).

whether military or civilian—to sue a government contractor in the circumstances presented here would “thrust the judiciary into making military decisions” (see *Tozer v. LTV Corp.*, *supra*, 792 F.2d at 406) and force the courts into the untenable position of examining and evaluating the wisdom of such decisions in the context of third-party tort litigation between private parties. This fundamental problem presents itself whether or not the injured party was an active-duty member of the armed services or a civilian government employee—or, for that matter, an innocent bystander.

This Court's decisions in *Feres* and *Stencel* were founded squarely upon the need to preserve the internal military discipline which is absolutely necessary and essential to the maintenance of the national defense. The focus of inquiry in such a context is necessarily upon the unique relationship between the United States military and its own personnel. That relationship is entirely immaterial in the context of the government contract specification defense, where the focus is, and must be, upon the government's ability to design and procure products necessary for its operation as a government—whether its operation as a government happens ultimately to injure military personnel or federal civilian employees.

The identity or status of persons affected by such decisions is simply immaterial to the issue of whether the courts should second-guess informed government procurement decisions. The identity or status of such persons is also immaterial to the issue of whether an innocent and obedient government contractor should be held liable for injuries caused by such informed governmental decisions. All public policy considerations which support application of the government contract specification defense to protect such a contractor from suit by an active-duty sailor as the result of a military decision to procure and use a particular product apply *with equal force* to protect the same contractor from liability to a civilian shipyard em-

ployee similarly injured as the result of precisely the same naval procurement decision.

That is the point which UNR seeks to make here. Government immunity from suit under the *Feres-Stencel* doctrine is simply irrelevant to—and certainly should not be incorporated as an essential element of—the government contract specification defense. See generally *Burgess v. Colorado Serum Co.*, *supra*, 772 F.2d at 846; *In re Air Crash Disaster at Mannheim Germany*, *supra*, 769 F.2d at 121; *Koutsoubos v. Boeing Vertol*, *supra*, 755 F.2d at 354.

CONCLUSION

For all of the foregoing reasons, UNR respectfully urges the Court to rule expressly that government immunity from suit under the *Feres-Stencel* doctrine is *not* an essential element of the government contract specification defense or, alternatively, to make clear that such immunity is not necessary to its decision of this case.

Respectfully submitted,

JOE G. HOLLINGSWORTH
SPRIGGS, BODE & HOLLINGSWORTH
1015 Fifteenth Street, N.W.
Washington, D.C. 20005
(202) 898-5800

Counsel of Record for
Amicus Curiae
UNR Industries, Inc.

Of Counsel

DONALD W. FOWLER
SPRIGGS, BODE & HOLLINGSWORTH
1015 Fifteenth Street, N.W.
Washington, D.C. 20005
(202) 898-5800

May 21, 1987

APPENDIX

APPENDIX

UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT

August Term, 1985

Nos. 1085, 1095, 1104

(Argued April 9, 1986 Decided _____)

Docket Nos. 85-6163, 85-6269, 85-6337

IN RE "AGENT ORANGE"
PRODUCT LIABILITY LITIGATION

MDL No. 381

Before: VAN GRAAFEILAND, WINTER, and MINER, *Circuit Judges*.

Appeals from a grant of summary judgment by the United States District Court for the Eastern District of New York, Jack B. Weinstein, *Chief Judge*, in multi-district litigation No. 381, dismissing claims against Agent Orange manufacturers by Vietnam veterans and members of their families who opted out of the Agent Orange class action litigation.

We affirm on the ground that the plaintiffs' claims are barred by the military contractor defense.

ROBERT A. TAYLOR, JR. and
WAYNE M. MANSULLA,
Washington, D.C.
(Ashcraft & Gerel
Washington, D.C.,
of counsel), for
Plaintiffs-Appellants.

RICHARD J. BARNES,
New York, New York
(Townley & Updike,
New York, New York,
of counsel), for
Appellee Monsanto Company.

Cadwalader, Wickersham
& Taft,
New York, New York,
for *Appellee Diamond
Shamrock Chemicals
Company.*

Rivkin, Radler, Dunne & Bayh,
Garden City, New York,
for *Appellee The Dow
Chemical Company.*

Kelley Drye & Warren,
New York, New York,
for *Appellee Hercules
Incorporated.*

Clark, Gagliardi & Miller,
White Plains, New York,
for *Appellee TH Agriculture
& Nutrition Company, Inc.*

Shea & Gould,
New York, New York,
for *Appellee Uniroyal, Inc.*

Budd, Larner, Kent, Gross,
Picillo, Rosenbaum,
Greenberg & Sade,
Short Hills, New Jersey,
for *Appellee Thompson
Chemicals Corporation.*

WINTER, Circuit Judge:

This opinion addresses the disposition of 287 appeals in cases brought by plaintiffs who chose to opt out of the Agent Orange class action. These cases remained in the Eastern District of New York after the class settlement as a result of the multidistrict referral. Chief Judge Weinstein granted summary judgment against each of the opt-out plaintiffs, most of whom now appeal.¹ To avoid repetition, this opinion assumes familiarity with the discussion of the fairness of the settlement in the first of this series of opinions, No. 84-6273, and with Chief Judge Weinstein's opinions reported at: 597 F. Supp. 740, 775-99, 819-50 (E.D.N.Y. 1984) ("*Settlement Opinion*"); 611 F. Supp. 1223 (E.D.N.Y. 1985) ("*Opt-Out Opinion*"); and 611 F. Supp. 1267 (E.D.N.Y. 1985) ("*Lilley Opinion*").

After they had settled with the class, the defendant chemical companies moved for summary judgment against the opt-out plaintiffs. Chief Judge Weinstein granted the motion on the alternative dispositive grounds that no opt-out plaintiff could prove that a particular ailment was caused by Agent Orange, *see Opt-Out Opinion*, 611 F. Supp. at 1260-63; *Lilley Opinion*, 611 F. Supp. at 1284-85, that no plaintiff could prove which defendant had manufactured the Agent Orange that allegedly caused his or her injury, *see Opt-Out Opinion*, 611 F. Supp. at 1263; *Lilley Opinion*, 611 F. Supp. at 1285, and that all the claims were barred by the military contractor defense. *See Opt-Out Opinion*, 611 F. Supp. at 1263-64; *Lilley Opinion*, 611 F. Supp. at 1285.

The district court's determination that individual causation could not be proven was based largely on its

¹ The appellants include Anna M. Lilley, an opt-out plaintiff against whom summary judgment was granted in a separate opinion. *See In re "Agent Orange" Product Liability Litigation*, 611 F. Supp. 1267 (E.D.N.Y. 1985) ("*Lilley Opinion*").

conclusion that the expert opinions submitted by the opt-out plaintiffs were inadmissible. Chief Judge Weinstein held that the opinions lacked a reliable basis and were therefore inadmissible under Fed. R. Evid. 703.² See *Opt-Out Opinion*, 611 F. Supp. at 1243-55; *Lilley Opinion*, 611 F. Supp. at 1280-83. He also found that the opinions were so unreliable that the danger of prejudice substantially outweighed their probative value under Fed. R. Evid. 403.³ See *Opt-Out Opinion*, 611 F. Supp. at 1255-56; *Lilley Opinion*, 611 F. Supp. at 1283.

The district court's determination that no plaintiff could prove which defendant caused his or her particular illness was based on the undisputed facts that the amount of dioxin in Agent Orange varied according to its manufacturer and that the government often mixed the Agent Orange of different manufacturers and always stored the herbicide in unlabeled barrels. See *Opt-Out Opinion*, 611 F. Supp. at 1263 (citing *Settlement Opinion*, 597 F. Supp. at 816-44). The court also rejected *sub silentio* various theories of enterprise and alternative liability that it had discussed in evaluating the settlement. See *Settlement Opinion*, 597 F. Supp. at 820-28. We do not address either of these grounds for the grant of summary

² Fed. R. Evid. 703 provides:

The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to him at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.

³ Fed. R. Evid. 403 provides:

Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.

judgment because we affirm on the military contractor defense.⁴

The district court granted summary judgment on military contractor grounds because it found no genuine factual dispute as to whether the government possessed as much information as the chemical companies about possible hazards of Agent Orange at pertinent times. See *Opt-Out Opinion*, 611 F. Supp. at 1263. This information concerned an association between dioxin exposure and cases of chloracne and liver damage. We agree with the district court that the information possessed by the government at pertinent times was as great as, or greater than, that possessed by the chemical companies. We add a further reason for affirming the grant of summary judgment based on the military contractor defense. Even today, the weight of present scientific evidence does not establish that Agent Orange injured personnel in Vietnam, even with regard to chloracne and liver damage. The chemical companies therefore could not have breached a duty to inform the government of hazards years earlier.

Our consideration of the military contractor defense has been greatly impaired by the inexplicable and unjustifiable failure of the opt-outs' counsel to brief the issue even though it was a dispositive ground for the grant of summary judgment.⁵ On appeal, their brief offers only the conclusory statement that "[t]he district court clearly committed error in holding that the government contract defense presented no genuine issues of material fact." We are then referred to 569 pages of deposition excerpts and documents, which are said to

⁴ Twenty-eight appellants made no evidentiary submission in response to the motion for summary judgment. We affirm those appeals on causation as well as military contractor grounds.

⁵ Counsel have also failed to brief the second ground for granting summary judgment, the indeterminate defendant issue.

"raise clear questions of material fact."⁶ No explanation is given of the relevance of these materials, however, and we are left in ignorance of appellants' view of the legal contours of the defense. Appellees, having no discussion to which they might respond, also do not address the issue.

We believe that federal law shields a contractor from liability for injuries caused by products ordered by the government for a distinctly military use, so long as it informs the government of known hazards or the information possessed by the government regarding those hazards is equal to that possessed by the contractor. The military contractor defense has been the subject of several recent judicial decisions, see *Boyle v. United Technologies Corp.*, 792 F.2d 413, 414-15 (4th Cir. 1986), cert. granted, 107 S. Ct. 872 (1987) (No. 86-492); *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986), petition for cert. filed, 55 U.S.L.W. 3337 (U.S. Oct. 23, 1986) (No. 86-674); *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985), petition for cert. filed, 54 U.S.L.W. 3632 (U.S. Mar. 17, 1986) (No. 85-1529); *Bynum v. FMC Corp.*, 770 F.2d 556 (5th Cir. 1985); *Tillett v. J.I. Case Co.*, 756 F.2d 591, 596-600 (7th Cir. 1985); *Koutsoubos v. Boeing Vertol*, 755 F.2d 352 (3d Cir.), cert. denied, 106 S. Ct. 72 (1985); *McKay v. Rock-*

⁶ The opt-outs' brief states in a footnote:

Plaintiffs have placed in the appendix a number of documents and deposition excerpts which were submitted in opposition to defendants' motions for summary judgment [sic]. Those documents and deposition excerpts raise clear questions of material fact. The Court's attention is respectfully commended to JA. 1717-24, 1759-1808, 2019-2356, 2392-2560, 2568-71. Plaintiffs regret that page constraints do not permit further comment on those documents. See, Master Class Action Brief, pp. 69-70.

We cannot agree that an editing of this 75-page brief, which can hardly be described as tightly written, would not have permitted a discussion of the military contractor issue.

well Int'l Corp., 704 F.2d 444 (9th Cir. 1983), cert. denied, 464 U.S. 1043 (1984), and has figured prominently in the instant litigation, see *In re Diamond Shamrock Chemicals Co.*, 725 F.2d 858, 861 (2d Cir.), cert. denied, 465 U.S. 1067 (1984); *In re "Agent Orange" Product Liability Litigation*, 597 F. Supp. at 847-50; 580 F. Supp. 690, 701-05 (E.D.N.Y. 1984); 565 F. Supp. 1263 (E.D.N.Y. 1983); 534 F. Supp. 1046, 1053-58 (E.D. N.Y. 1982); 506 F. Supp. 762, 792-96 (E.D.N.Y. 1980). Our rationale for the defense is similar to that recently expressed by the Court of Appeals for the Fourth Circuit:

Traditionally, the government contractor defense shielded a contractor from liability when acting under the direction and authority of the United States. *Yearsley v. W.A. Ross Constr. Co.*, 309 U.S. 18, 20, 60 S. Ct. 413, 414, 84 L.Ed. 554 (1940). In its original form, the defense covered only construction projects, *McKay v. Rockwell Int'l Corp.*, 704 F.2d 444, 448 (9th Cir. 1983), cert. denied, 464 U.S. 1043, 104 S. Ct. 711, 79 L.Ed.2d 175 (1984). Its application to military contractors, however, serves more than the historic purpose of not imposing liability on a contractor who has followed specifications required or approved by the United States government. It advances the separation of powers and safeguards the process of military procurement.

Tozer, 792 F.2d at 405.

Subjecting military contractors to full tort liability would inject the judicial branch into political and military decisions that are beyond its constitutional authority and institutional competence. See *Gilligan v. Morgan*, 413 U.S. 1, 10 (1973) ("The complex, subtle, and professional decisions as to the composition, training, equipping, and control of a military force are essentially professional military judgments, subject *always* to civilian control of the Legislative and Executive Branches.") (em-

phasis in original). The allocation of such decisions to other branches of government recognizes that military service, in peace as well as in war, is inherently more dangerous than civilian life. Civilian judges and juries are not competent to weigh the cost of injuries caused by a product against the cost of avoidance in lost military efficiency. Such judgments involve the nation's geopolitical goals and choices among particular tactics, the need for particular technologies resulting therefrom, and the likely tactics, intentions, and risk averseness of potential enemies. Moreover, military goods may utilize advanced technology that has not been fully tested. *See McKay*, 704 F.2d at 449-50 ("in setting specifications for military equipment, the United States is required by the exigencies of our defense effort to push technology towards its limits and thereby to incur risks beyond those that would be acceptable for ordinary consumer goods"). Whereas judges and juries may demand extensive safety testing for goods marketed in the civilian sector, such testing could impose costs and delays inconsistent with military imperatives.

The procurement process would also be severely impaired if military contractors were exposed to liability for injuries arising from the military's use of their products. Military contractors produce goods for the government according to specifications provided by the government and for uses determined by the government. As long as the government is aware of known hazards, the decision to take the risk is made by the government, and it would be destructive of the procurement process and thereby detrimental to national security itself to hold manufacturers liable for injuries caused by the military's use of their products. Costs of procurement would escalate if contractors were exposed to liability. Contractors would find insurance difficult or impossible to procure, and bankruptcies might occur among companies supplying products essential to national security. Firms would

take steps to avoid entering into government contracts, including resort to litigation. The effect on procurement would be particularly acute where claims of toxic exposure might be made and the number of potential claimants would be impossible to determine.

We also note that, absent the shield of the military contractor defense, the legal exposure of the contractor would be much greater than the exposure of a manufacturer that sells to a private corporation that uses its product. In the latter case, the user corporation will also be a defendant and bear some or all of the exposure. Under *Feres v. United States*, 340 U.S. 135 (1950), and *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666 (1977), however, the government cannot be sued and need not even cooperate with the contractor in defending personal injury litigation. Obtaining discovery from the government as a non-party might be difficult or even barred by a claim of national security privilege. The military contractor thus faces the great exposure of being the sole "deep pocket" available. In the instant matter, for example, the United States has avoided all claims against it and has refused to participate in settlement negotiations. Moreover, while the Veterans' Administration ("VA") and the Congress have declined to recognize any ailments other than chloracne and porphyria cutanea tarda ("PCT"), a rare liver disorder, as related to Agent Orange exposure, *see infra*, the chemical companies found it prudent to pay \$180 million notwithstanding the weakness of the plaintiffs' case.

At various stages in this litigation, Judge Pratt and Chief Judge Weinstein articulated somewhat different standards to govern the military contractor defense. Judge Pratt stated that each defendant would be required to prove the following elements:

1. That the government established the specifications for "Agent Orange";

2. That the "Agent Orange" manufactured by the defendant met the government's specifications in all material respects; and

3. That the government knew as much as or more than the defendant about the hazards to people that accompanied use of "Agent Orange".

In re "Agent Orange" Product Liability Litigation, 534 F. Supp. at 1055. In elaborating on the third element, Judge Pratt stated that a defendant could not employ the defense if it "was aware of hazards that might reasonably have affected the government's decision about the use of 'Agent Orange,'" *id.* at 1057, but failed to disclose them to the government. *Id.* at 1058.

After discovery and various motions, Judge Pratt concluded that disputes of material fact were involved in determining the third element—the relative knowledge possessed by the government and the chemical companies. *See In re "Agent Orange" Product Liability Litigation*, 565 F. Supp. at 1275. However, he concluded that all defendants were entitled to summary judgment with respect to the first two elements—that the government established the specifications for Agent Orange and that the Agent Orange manufactured by the defendants met these specifications in all material respects. *See id.* at 1274.

In approving the settlement, Chief Judge Weinstein addressed the military contractor defense as a potential bar to recovery by the plaintiffs. *See Settlement Opinion*, 597 F. Supp. at 843-50. While adopting the first two elements of the defense as defined by Judge Pratt, he modified the third element as follows:

A plaintiff would be required to prove, along with the other elements of his cause of action, that the hazards to him that accompanied use of Agent Orange were, or reasonably should have been known, to the defendant. The burden would then shift to each individual defendant to prove (1) that the gov-

ernment knew as much as or more than that defendant knew or reasonably should have known about the dangers of Agent Orange or (2), even if the government had had as much knowledge as that defendant should have had, it would have ordered production of Agent Orange in any event and would not have taken steps to reduce or eliminate the hazard.

Id. at 849. "In practical terms," Chief Judge Weinstein explained, this standard means "that a defendant would not be liable despite the fact that it negligently produced a defective product if it could show either that the government knew of the defect or that it would not have acted any differently even if it had known." *Id.* at 850.

We need not define the precise contours of the defense because we believe that under any formulation, and regardless of which party bears the burden of proof, the defendants here were entitled to summary judgment.

Agent Orange was a product whose use required a balancing of the risk to friendly personnel against potential military advantage. That balancing was the exclusive responsibility of military professionals and their civilian superiors. The responsibility of the chemical companies was solely to advise the government of hazards known to them of which the government was unaware so that the balancing of risk against advantage was informed.

Given the purpose of the duty to inform, a hazard that triggers this duty must meet a two-pronged test. First, the existence of the hazard must be based on a substantial body of scientific evidence. A court addressing a motion for summary judgment based on the military contractor defense must thus look to the weight of scientific evidence in determining the existence of a hazard triggering the duty to inform. The hazard cannot be established by mere speculation or idiosyncratic opinion, even if that opinion is held by one who qualifies as an expert under Fed. R. Evid. 702. A military contractor is no more obligated to inform the government of speculative risks than

it is entitled to claim speculative benefits. Second, the nature of the danger to friendly personnel created by the hazard must be serious enough to call for a weighing of the risk against the expected military benefits. Otherwise, the hazard would not be substantial enough to influence the military decision to use the product. Neither prong of the test is satisfied in the case of Agent Orange.

The use of Agent Orange in Vietnam was believed necessary to deny enemy forces the benefits of jungle concealment along transportation and power lines and near friendly base areas. Its success as a herbicide saved many, perhaps thousands of, lives. At the time of its use, both the government and the chemical companies possessed information indicating that dioxin posed some danger to humans. Indeed, there is evidence that the chemical companies feared that the presence of dioxin in Agent Orange might lead the government to restrict the sale of pesticides and herbicides in the civilian market. See P. Schuck, *Agent Orange on Trial* 85-86 (1986). However, the knowledge of the government and the chemical companies related to chloracne and certain forms of liver damage, ailments now known to be very rare among Vietnam veterans, and not to the numerous other ailments alleged in the instant litigation. Moreover, for the reasons stated in Chief Judge Weinstein's opinions, see *Opt-Out Opinion*, 611 F. Supp. 1263; *Settlement Opinion*, 597 F. Supp. at 795-99, we agree that the critical mass of information about dioxin possessed by the government during the period of Agent Orange's use in Vietnam was as great as or greater than that possessed by the chemical companies. Nevertheless, the government continued to order and use Agent Orange. The second prong of the test is therefore not met.

Because of the paucity of scientific evidence that Agent Orange was in fact hazardous, the first prong also is not met. This is not a case in which a hazard is known to have existed in hindsight and the issue is whether the

defendant had sufficient knowledge at an earlier time to trigger an obligation to inform. Rather, this is a case in which subsequent study indicates the absence of any substantial hazard and therefore negates any claim that the chemical companies breached a prior duty to inform.

When Agent Orange was being used in Vietnam, there was some evidence, possessed as we have said by both the government and the chemical companies, relating chloracne and liver damage to exposure to dioxin. Of course, the fact that dioxin may injure does not prove the same of Agent Orange, which contained only trace elements of dioxin. The precise hazard of the herbicide, if any, was thus a matter of speculation at the time of its use. Now, some 15 to 25 years after military personnel were exposed to Agent Orange, we have considerably more information about the effects of Agent Orange. As noted in our opinion upholding the settlement, No. 84-6273, and explained in greater detail in the district court's opinions approving the settlement, 597 F. Supp. at 787-95, and granting summary judgment against the opt-outs, 611 F. Supp. at 1231-34, epidemiological studies of those very personnel and their families fail to show that Agent Orange was hazardous, even with regard to chloracne and liver damage. While the decisions to use Agent Orange were being made, the most relevant question was not, "What will dioxin do to animals?" or even, "What will dioxin do to humans exposed to it in industrial accidents?" The most relevant question was, "What will Agent Orange do to friendly personnel exposed to it?" The epidemiological studies ask the latter question in hindsight and answer, "Nothing harmful so far as can be told." The fact that the epidemiological studies do not exclude the possibility of harm in isolated or unusual cases or in future cases is of no moment because it does not constitute evidence material to the military decisions in question. Hardly any product of military usefulness is known to be absolutely risk free. Consequently, the existence of a hazard of which the government should

have been informed remains unproven to this date, long after the relevant events. Indeed, although chloracne is a leading indicator of exposure to dioxin, it is very rare among Vietnam veterans. Accordingly, there never was information about material hazards that should have been imparted by the chemical companies to the government.

The military decision to use Agent Orange was, therefore, not ill-informed, much less ill-informed as a result of any action by the chemical companies. This conclusion is underscored by the actions of the VA and the Congress in addressing claims by veterans asserting injury by Agent Orange. The VA has recognized only chloracne and PCT as ailments related to Agent Orange. By May 1984, it had granted only 13 chloracne and two PCT claims. It later concluded that none of the 13 chloracne claims actually involved chloracne. *See Settlement Opinion*, 597 F. Supp. at 856 (citing remarks of Senator Cranston). In adopting the Veterans' Dioxin and Radiation Exposure Compensation Standards Act, Pub. L. No. 98-542, 98 Stat. 2725 (1984), Congress declined to compensate veterans claiming exposure to Agent Orange for ailments other than chloracne and PCT. It thus rejected earlier versions of the Act that would have compensated such veterans for other medical conditions, including soft tissue sarcomas and birth defects. *See M. Gough, Dioxin, Agent Orange* 225 (1986); *Settlement Opinion*, 597 F. Supp. at 855-57 (E.D.N.Y. 1984) (discussing earlier legislation).

The VA and the Congress thus continue to act on the factual conclusion that Agent Orange was hazardous, if at all, only with regard to chloracne and PCT. We believe these actions further demonstrate that the military decision to use Agent Orange was fully informed. To hold the chemical companies liable in such circumstances would be unjust to them and would create a devastating precedent so far as military procurement is concerned.

Affirmed.

AMICUS CURIAE

BRIEF

MOTION FILED
MAY 21 1987

No. 86-492

IN THE
Supreme Court of the United States

OCTOBER TERM, 1986

DELBERT BOYLE, PERSONAL REPRESENTATIVE OF THE
HEIRS AND ESTATE OF DAVID A. BOYLE, DECEASED,

Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

On Writ of Certiorari to the
United States Court of Appeals
for the Fourth Circuit

**MOTION FOR LEAVE TO FILE BRIEF AMICUS CURIAE
ON BEHALF OF THE RESPONDENT AND
BRIEF FOR THE CHAMBER OF COMMERCE
OF THE UNITED STATES AS AMICUS CURIAE**

HERBERT L. FENSTER

Counsel of Record

RAYMOND B. BIAGINI

RISA H. RAHINSKY

CHARLOTTE D. YOUNG

McKENNA, CONNER & CUNEO

1575 Eye Street, N.W.

Washington, D.C. 20005

(202) 789-7500

Of Counsel:

ROBIN S. CONRAD, ESQ.

NATIONAL CHAMBER

LITIGATION CENTER, INC.

1615 H Street, N.W.

Washington, D.C. 20062

(202) 463-5337

Attorneys for the Amicus Curiae

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**MOTION FOR LEAVE TO FILE BRIEF AMICUS CURIAE
ON BEHALF OF THE RESPONDENT**

The Chamber of Commerce of the United States ("Chamber") hereby respectfully moves for leave to file the attached brief *amicus curiae* in this case in support of the Respondent, United Technologies Corporation, as provided in Rule 42 of the Rules of this Court. The attorneys for the Petitioner in this case have declined to consent, at the request of the Chamber, to the filing of this brief *amicus curiae*. The attorneys for the Respond-

ent also declined to consent; however, they have encouraged the Chamber to file this brief *amicus curiae*.

The Chamber is the nation's largest federation of business organizations and individuals, having a total membership of more than 184,000. Many of these members manufacture military equipment that is frequently procured by the United States under a government contract. The basic issue posed by the instant case is of the deepest concern to all military contractors. That issue is the interpretation and application of the current government contract defense, which precludes a contractor's liability for injury allegedly caused by its military products. The movant is directly interested in the case because the Court's analysis of the government contract defense will have implications extending far beyond the particular situation now before the Court.

Petitioners, as well as Respondent, will necessarily concentrate on the particular facts of their case. In the annexed brief, however, the Chamber treats the issue of the government contract defense in a more generic fashion. Specifically, we emphasize the background, nature and underlying principles of the defense and focus on the problems of judicial second-guessing of military decisions that the defense, in its current application, often involves. In the attached brief, *amicus curiae* proposes a more straightforward application of the defense that courts can apply with relative ease and without second-guessing military decisions. We feel that our contribution can be of great assistance to the Court in setting the issues here presented in a broader context and in determining the most appropriate interpretation and application of the government contract defense.

Respectfully submitted,

HERBERT L. FENSTER
Counsel of Record
RAYMOND B. BIAGINI
RISA H. RAHINSKY
CHARLOTTE D. YOUNG
MCKENNA, CONNER & CUNEO
1575 Eye Street, N.W.
Washington, D.C. 20005
(202) 789-7500
Attorneys for the Amicus Curiae

Of Counsel:

ROBIN S. CONRAD, Esq.
NATIONAL CHAMBER
LITIGATION CENTER, INC.
1615 H Street, N.W.
Washington, D.C. 20062
(202) 463-5337

May 21, 1987

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IN THE
Supreme Court of the United States

OCTOBER TERM, 1986

No. 86-492

DELBERT BOYLE, PERSONAL REPRESENTATIVE OF THE
HEIRS AND ESTATE OF DAVID A. BOYLE, DECEASED,
Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,
Respondent.

On Writ of Certiorari to the
United States Court of Appeals
for the Fourth Circuit

BRIEF AMICUS CURIAE OF THE
CHAMBER OF COMMERCE OF THE UNITED STATES
IN SUPPORT OF THE RESPONDENT

STATEMENT OF INTEREST

The Chamber of Commerce of the United States ("Chamber") respectfully submits this brief *amicus curiae* in support of the Respondent, United Technologies Corporation. The Chamber is the nation's largest federation of business organizations and individuals. Its membership encompasses over 184,000 corporations, partnerships and proprietorships, as well as several thousand

trade and professional associations, and state and local chambers of commerce.

A significant portion of the Chamber's members manufactures military equipment for use by and under contracts with the United States government. The Court's resolution of the issues regarding the government contract defense in this case will substantially affect the existing relationship between these particular Chamber members and the government. These issues also bear on the extent to which the judiciary may examine military judgments made in the course of military procurement, a process in which *amicus curiae* is actively involved. Therefore, *amicus curiae* has a strong interest in the outcome of this case.

STATEMENT OF THE CASE

This case arises out of a helicopter accident that occurred incident to military duty. On April 27, 1983, a Marine helicopter, CH-53, manufactured by Respondent, Sikorsky Aircraft, a division of United Technologies Corporation ("UTC"), crashed in the Atlantic Ocean off the coast of Virginia Beach. Four of the five crew members survived the impact. Three crew members evacuated through emergency exits; co-pilot, David Boyle, who, although seated next to an emergency escape hatch, never opened the hatch and consequently drowned.

Petitioner alleged that UTC was liable for defectively designing the co-pilot's escape hatch and for allowing contaminants to enter the helicopter's hydraulic flight control system during its overhaul of that system. See *Boyle v. United Technologies Corp.*, 792 F.2d 413, 414 (4th Cir. 1986), *cert. granted*, 107 S. Ct. 872 (1987). Petitioner also alleged that a small metallic chip caused a malfunction in the helicopter's servo (a power steering mechanism), thereby causing the helicopter to crash. *Id.* The jury found in favor of Petitioner. Thereafter, UTC moved for a judgment notwithstanding the verdict on the grounds that the government contract defense precluded

liability and because Petitioner failed to establish that UTC was responsible for the helicopter's malfunction. The district court denied UTC's motion.

The United States Court of Appeals for the Fourth Circuit reversed and remanded the lower court's decision with directions to enter judgment for UTC.¹ Applying the elements of the government contract defense that were articulated in its concurrent decision in *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986), *petition for cert. filed*, 55 U.S.L.W. 3337 (U.S. Oct. 23, 1986) (No. 86-674),² the Fourth Circuit held that a military contractor can escape liability for a design defect if it can demonstrate the following four elements:

- 1) the United States is immune from liability under the *Feres/Stencel* doctrine;
- 2) the United States set or approved reasonably precise specifications for the equipment;
- 3) the equipment conformed to those specifications; and
- 4) the supplier warned the United States about dangers in the use of the equipment that were known to the supplier but not to the United States.

Boyle, 792 F.2d at 414. The court held that UTC had satisfied all four elements of this defense and thus, was

¹ The Fourth Circuit reversed the decision below based on the government contract defense and because there was insufficient evidence to conclude that UTC introduced the chip into the servo, which allegedly caused the servo to cease functioning. This brief *amicus curiae* addresses only the issues surrounding the government contract defense.

² The Fourth Circuit handed down three government contract decisions concurrently: *Boyle*, 792 F.2d 413 (4th Cir. 1986), *cert. granted*, 107 S. Ct. 872 (1987); *Dowd v. Textron, Inc.*, 792 F.2d 409 (4th Cir. 1986), *petition for cert. filed*, 55 U.S.L.W. 3176 (U.S. Sept. 9, 1986) (No. 86-379), and *Tozer*, 792 F.2d 403 (4th Cir. 1986), *petition for cert. filed*, 55 U.S.L.W. 3337 (U.S. Oct. 23, 1986) (No. 86-674). The Circuit's reasoning was detailed in the *Tozer* decision and then largely followed in *Boyle* and *Dowd*.

immune from liability for negligence or breach of warranty of the allegedly defective design of the escape hatch. *Id.* at 415.

The Fourth Circuit addressed each element of the government contract defense and its applicability to the instant case, with the exception of the United States' immunity from liability.⁵ The court concluded that the detailed "back-and-forth discussions between [UTC] and the Navy" were sufficient to establish government approval of the design in question. *Id.* at 414. The court found that the Navy reviewed and approved the model cockpit that UTC had built for the Navy, which contained all the instruments and controls called for by the design specifications. *Id.* Thus, the court held that the Navy approved reasonably detailed specifications for the escape hatch. *Id.* at 415.

The court also found that after UTC built the helicopter, the Navy accepted it as fully compliant with the specifications. *Id.* Finally, with respect to the contractor's duty to warn the government, the court determined that Petitioner failed to present evidence indicating that there were any hazards in the system about which UTC knew, but the Navy did not, especially given that the Navy had thirteen years of actual use and experience with the helicopter. *Id.*

On January 12, 1987, this Court granted Petitioner's request for a Writ of Certiorari to the United States Court of Appeals for the Fourth Circuit. *Boyle v. United Technologies Corp.*, 107 S. Ct. 872 (1987).

⁵ This requirement for "immunity" under *Feres/Stencel* was added by the Ninth Circuit in *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984), to the three-part test originally devised by Judge Pratt in *In re "Agent Orange" Product Liability Litigation*, 534 F. Supp. 1046 (E.D.N.Y. 1982). The requirement is of doubtful merit and can only serve to confuse the efforts of the courts to deal with the government's procurement, acceptance and use of goods. We, therefore, urge the Court to abandon its application.

SUMMARY OF THE ARGUMENT

The fundamental principle underlying the government contract defense is the impropriety of, and judicial aversion to, second-guessing military decisions. The application of the government contract defense, therefore, serves "the historic purpose of not imposing liability on a contractor who has followed specifications required or approved by the United States government." *Tozer*, 792 F.2d at 405. This defense, moreover, advances the tenet of separation of powers and safeguards the process of military procurement, given that the "judicial branch is by design the least involved in military matters." *Id.* Indeed, this Court has stated that the "complex, subtle, and professional decisions as to the composition, training, equipping, and control of a military force are essentially professional military judgments, subject *always* to civilian control of the Legislative and Executive Branches." *Gilligan v. Morgan*, 413 U.S. 1, 10 (1973) (emphasis in original).

Since 1982, the courts have grappled with the formulation and contours of a government contract defense that would enforce this policy of judicial non-interference in military decisions. See *In re "Agent Orange" Prod. Liab. Litig.*, 534 F. Supp. at 1055. From these efforts, the current government contract defense evolved, which consists of a four-part test. See *supra* p. 3. Although the intent of this defense is to prevent courts from second-guessing military decisions, the judiciary is in fact inexorably drawn into examining military judgments, thereby tending to undermine the very policy it hoped to enforce.

For instance, in determining whether the design of the military product was the military's or the contractor's, courts necessarily examine such issues as whether the military provided specifications to the contractor and, if so, whether they were "detailed" military design speci-

fications or simply "performance" specifications. Also, the modern-day government contract defense requires the courts to determine whether the military "reviewed and approved" contractor-prepared specifications and the nature and scope of the military's review and approval. Finally, the current government contract defense requires the judiciary to delve into the level of military knowledge regarding hazards of the product and to balance military expertise against the contractor's. Thus, because the judiciary is compelled to examine military decisions, the modern-day government contract defense mires the courts in the very questions they have sought to avoid.⁴

Admittedly, application of any government contract defense requires some judicial inquiry into military activities. For this reason, *amicus curiae* proposes that the Court apply a less complex test which would substantially minimize judicial inquiry into military-decision making and add certainty to the scope of contractors' immunity from tort liability. This test has its roots in the seminal Supreme Court decision which first enunciated, in its clearest form, the notion that a government contractor ought to be protected from liability if it is performing

⁴ *Amicus curiae* in no way suggests abandoning the current articulations of the government contract defense, which resulted from careful and painstakingly detailed judicial analysis of the contractor's relationship with the government. See, e.g., *McKay*, 704 F.2d 444; *Tozer*, 792 F.2d at 408 (adopting *McKay* test). Certainly, as between the *McKay* test and that proposed by the Eleventh Circuit in *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985), petition for cert. filed, 54 U.S.L.W. 3632 (U.S. Mar. 17, 1986) (No. 85-1529), *amicus curiae* supports the *McKay* test. *Amicus curiae*, however, believes that the Supreme Court should evaluate the test for contractor immunity that it articulated in *Yearsley v. W.A. Ross Construction Co.*, 309 U.S. 18 (1940) (discussed *infra*), which was the genesis of the government contract defense, as a means of simplifying the application of the defense.

at the behest of the government. *Yearsley v. W.A. Ross Construction Co.*, 309 U.S. 18 (1940).

In *Yearsley*, the Supreme Court ruled that the defendant, a company performing work under a contract with the federal government, was not liable for damages to private property resulting from its work improving navigation of the Missouri River. The Court held that if the authority to carry out the project is within the constitutional power of Congress, "there is no liability on the part of the contractor for executing its will." *Id.* at 20-21. Subsequently, state and federal courts have adopted *Yearsley's* rationale to shield government contractors from liability when they complied with government specifications. See, e.g., *Myers v. United States*, 323 F.2d 580, 583 (9th Cir. 1963); *Valley Forge Gardens, Inc. v. Morrissey, Inc.*, 385 Pa. 477, 123 A.2d 888 (1956).

Amicus curiae proposes a "Yearsley-type" defense which would reduce the need to delve into the substance of military decisions and which recognizes the close working relationship between the government and the contractor in today's military procurement process. Although the contractor's immunity in *Yearsley* was based on its agency relationship with the government, such a finding is unnecessary under the *Yearsley*-type defense because the proposed defense presupposes the existing "superior-subordinate" relationship between the military and its contractor.⁵ Under this defense, the judiciary's inquiry

⁵ The Solicitor General of the United States has referred to the test articulated in *Yearsley* as a constitutionally-based "government-agent defense," but recognizes that the relationship between government and contractor is always more complex in the design and manufacture of military weapons. See *Grumman Aerospace Corp. v. Shaw*, No. 85-1529 (U.S. May 27, 1986), On Petition For A Writ of Certiorari To the United States Court of Appeals for the Eleventh Circuit, Brief for the United States as Amicus Curiae, at 8, 13 n.14.

Because the *Yearsley*-type defense does not require a finding that the contractor is an agent of the government, cases in which the

is simple and direct: the court need only determine the nature of the product and the nature of its use by the military. A military contractor would not be liable in tort for injuries resulting from a product provided to the military if the product was a "uniquely military good" or one which, although of commercial origin, has been adapted to uniquely military purposes. See *In re "Agent Orange" Product Liability Litigation*, Nos. 85-6163, 85-6269, 85-6337, slip op. at 5 (2d Cir. Apr. 9, 1986) (precluding contractor liability for products with "distinctly military use"). A uniquely military good is one that had been either a commercial product altered by the contractor for military application or had been a product originally designed and built for the military. By contrast, if the product was a commercial "off-the-shelf" item, simply supplied "as is" to the military and employed for normal commercial purposes, the *Yearsley*-type defense would not apply.

Having determined the character of the product, a court need only determine that the product was put to a military use. Government representations or testimony regarding acceptance or satisfaction, or evidence of use of the contractor's product in the field would fulfill this evidentiary requirement.

Assuming the contractor satisfies this burden of proof, a presumption arises that the contractor is immune from tort liability, unless the plaintiff shows that the contractor deliberately acted outside the scope of its contract with the military, e.g., by intentionally withholding information from the government regarding known hazards of the design or deliberately failing to comply with the specifications. Absent such proof, the military contractor is presumed immune from tort liability because its act is

Supreme Court has stated that contractors are not agents of the government are inapposite. E.g., *United States v. New Mexico*, 455 U.S. 720 (1982).

"the act of the government." *Yearsley*, 309 U.S. at 22, citing *United States v. Lynah*, 188 U.S. 445, 465 (1903); see also *The Paquete Habana*, 189 U.S. 453, 461-62 (1903) (agent immune even where government held liable for authorizing unlawful taking).

Application of this *Yearsley*-type defense would substantially minimize judicial intrusion into military decisions. Unlike the current test, the judiciary need not engage in unbounded consideration of military participation in the design process in order to determine the applicability of the government contract defense. Further, the judiciary will not need to determine whether specifications are "reasonably precise" or not. Nor will the courts need to delve into the level of military knowledge related to product hazards.

Instead, the *Yearsley*-type defense proposed here recognizes the military-contractor relationship for what it is: a superior-subordinate relationship in which there is always give and take in arriving at the ultimate product design, but which relationship and design is always ultimately controlled by the superior, the military. Moreover, by focusing on whether the product was satisfactory to the military, the *Yearsley*-type defense properly redirects the judiciary's attention away from civilian notions of product safety and to the more relevant and limited concept of whether the product served the government's purpose.

Finally, to assure uniform application of the *Yearsley*-type defense, *amicus curiae* urges the Court to adopt the defense as federal common law. This will also avoid the interpretation problems and varying results encountered by the courts in applying the current government contract defense. As will be described more fully herein, the *Yearsley*-type defense provides certainty to the scope of contractors' tort immunity and thus, safeguards the separation of powers concept that the judiciary should not

interfere with military decisions. Also, application of this defense will have the ripple effect of encouraging contractors to compete for essential military projects and of avoiding an unwarranted addition to procurement and insurance costs. As such, this test should be adopted by the Court.

ARGUMENT

I. THE YEARSLEY-TYPE DEFENSE RECOGNIZES THE SUPERIOR-SUBORDINATE NATURE OF THE RELATIONSHIP BETWEEN THE MILITARY AND ITS CONTRACTORS

In the early days of our republic, the government usually purchased in the marketplace goods—including military—which were *not* unique to its needs. Except for cannons, ships-of-war and other similar goods, the government bought the same guns and weapons which had been designed for nonmilitary objectives. (It is not altogether clear that the Constitution even contemplated a standing army or air force which might carry on efforts to evolve weapons “systems.”)

If the government were merely buying the same, or substantially the same, goods as were being offered in the commercial marketplace and putting such goods to the same or similar civilian uses, the courts, seemingly, would have little trouble in applying civilian notions of consumer tort law against those who manufactured such goods even where the “users” were service personnel. However, even in this presumably non-contentious setting the roots of the present problem may be seen: How are courts to judge the motivations of the military in acquiring goods from the commercial marketplace, which are then put to unique uses, or altered, or inadequately maintained, or placed in the hands of inadequately trained personnel?

As much as commercial goods can, under some circumstances, present difficult tort questions for the courts when purchased by the military, uniquely military goods inher-

ently present impossible questions. *E.g.*, *Tozer*, 792 F.2d at 406 (“[d]ifficult choices, tradeoffs, and compromises inhere in military planning that simply find no analogue in civilian life”); *McKay*, 704 F.2d at 453 (“Members of the armed forces are not ordinary consumers with respect to military equipment”).

The case now before this Court is an excellent example of just such an impossible question of tort law. The CH-53 helicopter was a uniquely military weapon system. While some of its design and operational characteristics may have been shared with commercial conveyances, by no means was it intended for the commercial marketplace, nor was it intended for normal commercial transportation. As noted by the United States Court of Appeals for the Ninth Circuit in *McKay*, “the United States is required by the exigencies of our defense effort to push technology toward its limits and thereby incur risks beyond those that would be acceptable for ordinary consumer goods”). *Id.* 704 F.2d 449-50. Thus, to apply commercial tort law fairly to a weapon system is to indulge in a clear oxymoron.

This is the dilemma with which the courts have been wrestling, unwilling to abandon entirely the application of commercial tort law to uniquely military goods. Instead, courts have fashioned three- and four-part tests which may create a legal and logical gloss on a result that may otherwise seem too harsh for the survivors of those who have served their country well. The problem not only resembles, it is in fact, the analog of the issue presented to this Court in *Feres v. United States*, 340 U.S. 135 (1950). However, it lies not for the courts to weave commercial tort law into the pattern of conduct in which the military acquires its unique weapons of war or puts commercial goods to war uses; the concern is better addressed by the other two branches of government.

Until 1982, the only clear guidance in this area had been from this Court in *Yearsley* in 1940. In *In re "Agent Orange" Prod. Liab. Litig.*, 534 F. Supp. at 1050, 1055, Judge John Pratt, now of the Second Circuit, was faced with an immense class action growing out of exposure of service personnel to the chemical "Agent Orange" in Vietnam. Few cases could engender greater judicial sympathy. However, the circumstances of the "design" and use of this commercial herbicide were so clearly unique to the perceived needs of the military that the imposition of liability under commercial tort law was inappropriate. Instead, the court fashioned a three-part test which sought to place on the shoulders of the military the responsibility for design, acceptance and use of the product.⁶

In the five years that have followed, the *Agent Orange* test has been refashioned into four parts and the parts refined by the perceptions and exigencies of the individual cases. The circuit courts have addressed the problems in definitive decisions, several of the circuits on more than one occasion.⁷ With the exception of the Eleventh Cir-

⁶ The Second Circuit has abandoned this articulation of the test in favor of the government contract defense enunciated in *McKay*, 704 F.2d at 448-451. See *In re "Agent Orange" Prod. Liab. Litig.*, Nos. 85-6163, 85-6269, 85-6337, slip op. at 5-7 (2d Cir. Apr. 9, 1986).

⁷ See *Boyle v. United Technologies Corp.*, 792 F.2d 413, 414-15 (4th Cir. 1986), cert. granted, 107 S. Ct. 872 (1987); *Dowd v. Textron, Inc.*, 792 F.2d 409 (4th Cir. 1986), petition for cert. filed, 55 U.S.L.W. 3176 (U.S. Sept. 9, 1986) (No. 86-379); *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986), petition for cert. filed, 55 U.S.L.W. 3337 (U.S. Oct. 23, 1986) (No. 86-674); *In re Air Crash Disaster at Mannheim Germany*, 769 F.2d 115 (3d Cir.), cert. denied, 106 S. Ct. 851 (1986); *Bynum v. FMC Corp.*, 770 F.2d 556 (5th Cir. 1985); *Tillett v. J.I. Case Co.*, 756 F.2d 591, 596-600 (7th Cir. 1985); *Koutsoubos v. Boeing Vertol*, 755 F.2d 352 (3d Cir.), cert. denied, 106 S. Ct. 72 (1985); *McKay v. Rockwell Int'l Corp.*, 704 F.2d 444 (9th Cir. 1983), cert. denied, 464 U.S. 1043 (1984); *Brown v. Caterpillar Tractor Co.*, 696 F.2d 246 (3d Cir. 1982); *In re*

cuit, the result in each case has been the same: commercial tort law cannot be applied to uniquely military goods or to commercial goods put to uniquely military purposes. Even the Eleventh Circuit felt pulled by this result but was unwilling in the end to excuse the contractor. See *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985), petition for cert. filed, 54 U.S.L.W. 3632 (U.S. Mar. 17, 1986) (No. 85-1529).

Underlying these modern-day versions of the government contract defense is a judicial deference for military judgments concerning the proper equipping of the armed services. Courts have adopted the view that there are few areas of government activity in which courts have less competence or that raise such significant separation of powers concerns. *Chappell v. Wallace*, 462 U.S. 296, 302 (1983). As the court in *United States v. General Dynamics Corp.*, 644 F. Supp. 1497 (C.D. Cal. 1986), rev'd on other grounds, 813 F.2d 1441 (9th Cir. 1987), recognized, "the defense industry in this country is highly regulated. In fact . . . it is ' . . . essentially . . . totally regulated.' " *Id.* at 1503 (citation omitted). The court emphasized that

the Government has acquired detailed control over the actions of its contractors . . . through webs of laws, regulations, and directives, that can almost defy understanding as they descend to the smallest details, and ascend to the most grandiose plans. . . . "[T]he Department of Defense is the regulator, the specifier of new products, the 'banker,' the judge of claims, and almost the sole buyer."

Id. at 1504 (citation omitted). As this Court in *United States v. Johnson*, No. 85-2039, slip op. at 9 (U.S. May

"*Agent Orange*" Product Liability Litigation, 597 F. Supp. 740, 847-50 (E.D.N.Y. 1984); 580 F. Supp. 690, 701-05 (E.D.N.Y. 1984); 565 F. Supp. 1263 (E.D.N.Y. 1983); 534 F. Supp. 1046, 1053-58 (E.D.N.Y. 1982); 506 F. Supp. 762, 792-96 (E.D.N.Y. 1980).

18, 1987), most recently stated, "[i]n every respect the military is . . . 'a specialized society'" (citation omitted).

Further, almost every government contract is a "rated order" contract pursuant to the Defense Production Act, 50 U.S.C. app. § 2157 (1982). Under these rated orders, the contractor is compelled by law to assist the government. Consequently, courts have consistently recognized that military judgments concerning equipment safety and related matters should not be questioned. *See Tozer*, 792 F.2d at 406 ("Military contractors ordinarily work so closely with the military . . . that it is nearly impossible to contend that the contractor defectively designed a piece of equipment without actively criticizing a military decision").

Given the close, and often symbiotic, relationship between the military and its contractors, it is only proper that contractors enjoy the same immunity from tort liability as the military where injured service personnel are involved. As described below, the *Yearsley*-type defense would better convey this principle.

A. First, the Court Would Determine Whether an Item Was a Purely Commercial or Military Product. This Requires Little Judicial Interpretation

At the outset, to trigger the *Yearsley*-type defense, the judiciary need only determine whether the product was (1) a commercial product that was put to unique military purposes or was materially altered for military use or (2) specially designed and produced for the military. Courts have treated these two categories as uniquely military goods. As such, these products should not be judged by commercial tort law standards. However, if the product was simply a commercial product supplied to the military, as is, and used for a purpose not uniquely military, then the *Yearsley*-type defense would not apply.

Courts have found that uniquely military goods include everything from fighter aircraft, which have no commer-

cial counterparts, *see, e.g., McKay*, 704 F.2d at 451, to equipment which clearly has commercial elements, but has been modified in a material respect to meet the government's needs. *See, e.g., Tillett*, 756 F.2d at 598 (front end loader qualifies as military equipment). Items such as tractors, jeeps and even dough mixers have qualified as military equipment because each item in its commercial form was modified for military use. *See Brown v. Caterpillar Tractor Co.*, 696 F.2d 246 (3d Cir. 1982); *Sanner v. Ford Motor Co.*, 144 N.J. Super. 1, 364 A.2d 43 (1976), *aff'd*, 154 N.J. Super. 407, 381 A.2d 805 (1977), *certif. denied*, 75 N.J. 616, 384 A.2d 846 (1978); *Casabianca v. Casabianca*, 104 Misc. 2d 348, 428 N.Y.S. 2d 400 (1980); *see also In re "Agent Orange" Prod. Liab. Litig.*, 534 F. Supp. at 1054 (government's use of essentially commercial herbicide defied well-established protocols for safety, application, training, labeling and handling and thus, constituted military good). Hence, determining whether a product is military or commercial is comparatively simple and requires no intrusion by the courts into military decision making.

B. Second, the Court Would Determine If the Product Was Put to a Military Use

Evidence that a product was put to a military use can be proved in several ways, none of which require the judiciary to second-guess the government's procurement decisions. The contractor may meet this burden of proof simply through (1) government testimony in court that the goods were acceptable; (2) government attestation in the form of an affidavit; (3) contract documents (e.g., Form DD 250, which establishes procurement quality assurance, acceptance of supplies and services, and shipments, *see* 48 C.F.R. ch. 18, §§ 1846.670-770 (1986); proof of payment; contract completion; warranty records; and subsequent contracts); or (4) evidence that the goods were placed in service and successfully used for their

intended purpose.⁸ Proof of any one of these would demonstrate that the government received the product it desired and found it acceptable. The application of this type of evidentiary test renders unnecessary, for instance, judicial second-guessing of the adequacy of the design of the product, which courts have agreed is an unacceptable intrusion into military affairs. See *Dowd*, 792 F.2d at 412; *Bynum*, 770 F.2d at 576.

If the contractor meets this evidentiary burden, the presumption of immunity from tort liability is created. The burden would then shift to the plaintiff to prove that the contractor deliberately acted outside the scope of the contract. For example, the plaintiff would have to show that the contractor intentionally withheld information from the government concerning safety features or known risks of which the government was unaware. Judicial inquiry into anything but deliberate acts by the contractor would, once again, necessarily draw courts into second-guessing military decisions. Under a lesser standard than proposed here, courts have to evaluate what the contractor and military knew or should have known about the product's hazards. Such an evaluation is anathema to the well-established judicial aversion to questioning military decisions pertaining to national defense.

C. Application of the *Yearsley*-Type Defense Avoids Judicial Second-Guessing of Military Decisions as Dictated by the *Feres/Stencel* Doctrine and the Discretionary Function Exception

The driving force behind the need for a straightforward government contract defense is the well-established admonition against the judiciary questioning and debating military decisions. To permit judicial and civilian scrutiny of the "[d]ifficult choices, tradeoffs, and compromises inher[en]t in military planning that simply find

⁸ See, e.g., *Boyle*, 792 F.2d at 413 (successful use of Marine helicopter for 13 years prior to accident).

no analogue in civilian life," *Tozer*, 792 F.2d at 406, violates the principles from which the *Feres/Stencel* doctrine and the "discretionary function exception" to the Federal Tort Claims Act (FTCA), 28 U.S.C. § 2680 (1982), evolved.

The *Feres/Stencel* doctrine prohibits suits against the government because they encourage servicemen and civilians to challenge military judgments. *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666, 673, *reh'g denied*, 434 U.S. 882 (1977); *Feres v. United States*, 340 U.S. 135 (1950); see also *United States v. Johnson*, slip op. at 4-10. The design alternatives explored by government contractors necessarily depend on uniquely military considerations in an effort to satisfy the government's requirements for a particular military objective. *Bynum*, 770 F.2d at 569. Often the design involves highly classified information regarding the "threats" to be countered by the weapon system. Thus, to hold the contractor liable for implementing military decisions, would necessarily violate the *Feres/Stencel* bar against questioning the government's military discretion and suing the United States for injury or damages resulting from those military decisions. However, by inquiring only into the military or commercial nature and use of the procured goods, and whether the goods were satisfactory according to the government, the *Yearsley*-type defense obviates the need to question the merits of military decisions.

Moreover, under the discretionary function exception to the FTCA, 28 U.S.C. § 2680(a), acts of subordinates in carrying out discretionary government operations in accordance with official directions cannot be actionable. *United States v. S.A. Empresa-de Viacao Aerea Rio Grandense (Varig Airlines)*, 467 U.S. 797, 808, *reh'g denied*, 468 U.S. 1226 (1984); *Dalehite v. United States*, 346 U.S. 15, 35-36 (1953). Through the contractor, the government is implementing a discretionary function. A

suit challenging the contractor's performance, therefore, challenges the government's discretion with respect to the procurement and design of a military piece of equipment. See *Tozer*, 792 F.2d at 406. Relying on *Varig*, the Tenth Circuit stated in *Allen v. United States*, No. 84-2126 (10th Cir. Apr. 20, 1987), that the political, social and economic judgments of the government should not be second-guessed because these "decisions expressly [balance] public safety against . . . national necessity, in light of national and international security. However erroneous or misguided these deliberations may seem today, it is not the place of the judicial branch to now question them." *Id.*, slip op. at 15; see also *In re "Agent Orange" Product Liability Litigation*, Nos. 85-6091, 85-6093, 85-6095, slip op. at 9-12 (2d Cir. Apr. 21, 1987) (emphasizing importance of applying discretionary function considerations to avoid judicial interference in military and political affairs).

Thus, courts would undermine the very principles of the *Feres/Stencel* doctrine and the discretionary function exception by requiring a contractor, who is merely performing at the military's behest, to bear the burden of liability for the government's potentially "misguided" discretionary decisions. The *Yearsley*-type defense would preserve the purpose of these principles by precluding suits by servicemen and civilians against the contractor who is doing the work of the government.

D. Contrary to the *Yearsley*-Type Defense, the Application of the Modern-Day Government Contract Defense Inevitably Requires Judicial Inquiry into Strictly Military Decisions

The most dangerous conduct indulged by the courts applying *McKay* has been the review of *why* the military has continued to use a product which was dangerous (allegedly defective) or has placed the product in service in the first place. Such reviews have occurred in a number of these cases and most recently in *Shaw v. Grum-*

man, 778 F.2d 736. Such a review plainly places the court in the position of inquiring into—and perhaps challenging—the delicate judgment which the military may make to risk human life in using a dangerous weapon to accomplish a military objective. Under the *McKay* test, such a review could be compelled by a carefully orchestrated complaint in virtually every case.

Specifically, in determining whether the government established the specifications, courts inevitably ignore the significance of the superior-subordinate relationship between the government and its contractor. The result is an intrusive, quantitative comparison of the government and contractor's participation in the specification's development. The result in *Trevino v. General Dynamics Corp.*, 626 F. Supp. 1330 (E.D. Tex. 1986), *appeal filed*, No. 86-2975 (5th Cir. Mar. 27, 1987), epitomizes the inappropriateness of this type of judicial scrutiny. In *Trevino*, the district court compared the quantity of paper generated by the contractor and the Navy in concluding that the specifications were the contractor's. The court reached this determination simply because the Navy provided the contractor with "mere skeletal guidelines" from which the contractor "produced 71 pages of highly detailed working drawings." *Id.* at 1336. Indeed the court in *Shaw v. Grumman* further complicated this element by requiring a determination that the specifications were "detailed, precise and typically quantitative." 778 F.2d at 745.

Determining whether the United States "approved" reasonably precise specifications for the equipment also forces courts to examine the military's expertise and mission objectives. For example, in *Shaw v. Grumman*, the Eleventh Circuit subjectively scrutinized the government's participation in preparing the specifications to determine whether such participation was "sufficiently great" to invoke the government contract defense. 778

F.2d at 746; *see also Brown v. Caterpillar Tractor Co.*, 696 F.2d 246 (3d Cir. 1982) (refusing to impose liability on contractor without further examination by district court of the extent of government involvement).

Courts have become mired in questions of what constitutes "meaningful approval" by the military of contractor-prepared specifications. For example, in the instant case, the nature and extent of the exchange of information between the contractor and the government became an issue for the jury. *Boyle*, 792 F.2d at 414. The jury determined whether the Navy sufficiently approved the design within the meaning of *McKay* by analyzing the detail of the "back-and-forth discussions between Sikorsky and the Navy." *Id.* Such an inquiry into government approval clearly invites judicial interference with purely discretionary military decisions and improperly presumes that the judiciary can best judge what the military is capable of understanding with respect to military decisions of national security. *E.g.*, *Shaw v. Grumman*, 778 F.2d at 745, 747 (determining that Navy did not have sufficient expertise to render informed military decision to accept dangerous product, 'although the Navy did formally approve [the contractor's] specifications and design changes').

With respect to determining whether the equipment conformed to the specifications, it is virtually impossible to measure compliance without an inquiry into government decision making. Each court that has applied the government contract defense, *see supra*, n.7, has examined goods that the government (1) accepted; (2) placed in service; and (3) used for some period of time. Such evidence of acceptance and use is *prima facie* evidence of compliance. Despite such evidence of compliance, some courts have painstakingly compared the specifications to the hardware to determine "compliance with specifications." This judicial inquiry has been made even where the evidence showed that the government had ac-

cepted the original design as fully compliant and successfully used the product for years prior to the accident, *see, e.g.*, *Boyle*, 792 F.2d at 415, or where the government dictated instructions for use of the product, *see, e.g.*, *In re "Agent Orange" Prod. Liab. Litig.*, Nos. 85-6163, 85-6269, 85-6337, slip op. at 8, 11, 14-15. In fact, in *Trevino* the district court's inquiry into compliance so invaded military judgment that the court actually held that the Navy was partially (20%) negligent in causing the accident. 626 F. Supp. at 1338.

With respect to the duty to warn the government of dangers known to the contractor but not the military, courts invariably are required to explore the extent of the government's knowledge, which becomes a pivotal focus of proving the current government contract defense. For example, in *Koutsoubos v. Boeing Vertol*, No. 81-1090, Bench Opinion (E.D. Pa. Feb. 15, 1984), *aff'd*, 755 F.2d 352 (3d Cir.), *cert. denied*, 106 S. Ct. 72 (1985), the district court examined in great detail the specifications to determine whether the Navy knowingly chose the alleged defective design. The court concluded that "[the contractor's] information was Navy information in its substantial entirety; Navy information in its inception and then in its return. So that as between the two . . . it was the Navy which was the better informed." *Id.* at 22A. *See also Shaw v. Grumman*, 778 F.2d at 746 (inviting courts to assess sufficiency of knowledge based on "evidence that goes to the military's own level of relevant knowledge and expertise"). Moreover, in *Trevino*, the district court was required to review in chambers classified military documents relating to the Navy's alleged prior superior knowledge of product hazards, the substance of which was never revealed to the defendant. Thus, a determination of military knowledge necessarily puts the government on trial; the contractor will be forced to convince the court of the government's equal or superlative knowledge, while the plaintiff embarks on establishing the government's ignorance.

Although the current government contract defense was intended to safeguard the notion that the judiciary refrain from second-guessing the military, in fact, application of the defense necessarily mires the courts in such considerations. By contrast, the *Yearsley*-type defense minimizes such intrusions and thus furthers the separation of powers principles which are at the heart of this defense. By providing certainty to the scope of a contractor's immunity, the *Yearsley*-type defense encourages contractors to compete on essential military projects and to share ideas freely. This has the ripple effect of controlling escalating procurement and insurance costs as well as minimizing the potential for bankruptcy. *Bynum*, 770 F.2d 556; *In re "Agent Orange" Prod. Liab. Litig.*, Nos. 85-6163, 85-6269, 85-6337, slip op. at 8.⁹

II. FEDERAL COMMON LAW SHOULD BE THE BASIS FOR THE *YEARSLEY*-TYPE DEFENSE

A. The Application of Federal Common Law Is an Important Issue in This Case

Amicus curiae believes that to enhance further the clarity of the scope of contractors' tort immunity, the *Yearsley*-type defense should be adopted by the Court as federal common law. This will help assure that the defense receives uniform application by the lower courts and will avoid the interpretation problems and varying results encountered in application of the current government contract defense.

⁹ The contractor's need for a broad-based defense to tort liability is further underscored by the fact that the government may not be legally bound to indemnify a contractor for tort damages even where the government had agreed to do so. According to the United States Claims Court in *Johns-Manville Corp. v. United States*, Nos. 465-83C, 170-83C, 16-84C, slip op. at 26-31 (Cl. Ct. Mar. 6, 1987), government fulfillment of such indemnity obligations would violate the Anti-Deficiency Act, 31 U.S.C. § 1341(a)(1) (1982).

Only a few courts have directly addressed the question of whether a government contract defense should be a matter of state or federal common law and their results conflict. Compare *Bynum*, 770 F.2d at 567-74 (federal common law is the basis for the defense) and *Koutsoubos v. Boeing Vertol*, 755 F.2d at 354 (same), and *In re "Agent Orange" Prod. Liab. Litig.*, 597 F. Supp. at 845-47 (same) with *Brown v. Caterpillar Tractor Co.*, 696 F.2d at 248-49 (state law applied) and *In re Air Crash Disaster at Mannheim Germany*, 769 F.2d at 120 & n.7 (same) and *Tillett*, 756 F.2d at 593-94 (same). As such, this issue is ripe for determination by this Court.

B. Federal Common Law Should Be Adopted

Under *Erie R.R. v. Tompkins*, 304 U.S. 64, 78 (1938) there is, of course, "no federal general common law." Where the issues involved regard federal policy, however, *Erie* does not apply. *United States v. Standard Oil Co.*, 332 U.S. 301, 309-10 (1947). In *Texas Industries v. Radcliff Materials, Inc.*, 451 U.S. 630 (1981) this Court explained the circumstances under which the application of federal common law is appropriate:

[A]bsent some congressional authorization to formulate substantive rules of decision, federal common law exists only in such narrow areas as those concerned with the rights and obligations of the United States In these instances, our federal system does not permit the controversy to be resolved under state law, either because the authority and duties of the United States as sovereign are intimately involved or because the interstate or international nature of the controversy makes it inappropriate for state law to control.

Id. at 641 (footnotes omitted).

In deciding whether federal law should be the basis for a decision the courts have considered the following questions:

- 1) Are the interests involved uniquely federal?
- 2) What would be the effect on federal interests if state law were imposed?
- 3) What would be the effect on state interests if state law were displaced by federal common law?

E.g., *United States v. Kimbell Foods, Inc.*, 440 U.S. 715, 726-27 (1979); *Miree v. DeKalb County*, 433 U.S. 25, 29-31 (1977); *Illinois v. City of Milwaukee*, 406 U.S. 91, 105 n. 6 (1972); *Standard Oil*, 332 U.S. at 305; *Clearfield Trust Co. v. United States*, 318 U.S. 362, 367 (1943).

Amicus curiae suggests only the application of federal common law to the *Yearsley*-type defense and not to the underlying cause of action. Applying federal common law would neither create federal jurisdiction nor displace state laws regarding tort or contract claims. In this context, the answers to the questions listed above warrant the application of federal common law to the government contract defense.

1. *The interests involved are uniquely federal*

The first inquiry in determining whether to apply federal common law is: Are the interests involved "uniquely" or "distinctively" federal? *E.g.*, *Texas Indus. v. Radcliff Materials, Inc.*, 451 U.S. at 640; *Clearfield Trust Co.*, 318 U.S. at 366. This question is grounded in the constitutional mandate of federal supremacy in the performance of federal functions. *Standard Oil*, 332 U.S. at 306. In the instant case, the federal power arises from the constitutional authority to establish and maintain a military.

Consideration of the government contractor defense necessarily involves an inquiry into the uniquely federal arena of military decision making. The defense turns on the relationship between the federal government and its military contractors, a relationship which has been de-

scribed by this Court as "distinctively federal." *E.g.*, *Stencel Aero Eng'g Corp. v. United States*, 431 U.S. at 672 ("[t]he relationship between the Government and its suppliers of ordnance is certainly no less 'distinctively federal in character' than the relationship between the Government and its soldiers") (citation omitted); *see also Standard Oil*, 332 U.S. at 306; *Chappell v. Wallace*, 462 U.S. at 305. As a result of the considerations necessarily involved, the federal government is inextricably intertwined with the defense. *Cf. Miree v. DeKalb County*, 433 U.S. at 28-29 ("The litigation before us raises no question regarding the liability of the United States or the responsibilities of the United States under the contracts."); *Bank of America National Trust & Savings Ass'n v. Parnell*, 352 U.S. 29, 34 (1956) (federal common law would not apply to "transactions essentially of local concern"). Thus, the overriding policy interests in avoiding judicial interference with military decision making mandates that federal common law apply to a government contract defense.¹⁰

2. *State law, if imposed, would have a negative effect on federal interests and would conflict with federal policy*

The second question courts pose in deciding whether to apply federal common law is whether the application of state law would adversely affect federal policies and interests. The main focus of this inquiry is the need for uniformity in the substantive law. *E.g.*, *Standard Oil*, 332 U.S. at 307; *Kimbell Foods, Inc.*, 440 U.S. at 729.

¹⁰ In fact, the Solicitor General of the United States has stated that "in actions where claims are premised upon state tort law, federal common law is also appropriate to determine the extent of the military contractor defense." *Grumman Aerospace Corp. v. Shaw*, No. 85-1529, Brief for the United States as Amicus Curiae at 9, n.11. *Cf. Miree v. DeKalb County*, 433 U.S. at 29-30 (the Solicitor General determined no federal interests were involved and waived his right to respond).

If each of the states were allowed to fashion their own version of a government contract defense, the federal government would not only be subject to judicial inquiry into its decision making process, but would be subject to differing and potentially unclear standards as well. The government's duty to oversee its military contractors and make risk-balancing decisions regarding the products those contractors produce should not be frustrated by or dependent upon the local law of the various states. Indeed, much of the current confusion which is reflected in the instant case is due to a lack of uniformity in the application of the government contract defense. It is therefore appropriate that federal law form the basis for the *Yearsley*-type defense.

3. Imposition of federal common law would not displace state interests

The third and final consideration is whether, by applying federal common law, this Court would displace state interests or policies. *E.g.*, *Wallis v. Pan American Petroleum Corp.*, 384 U.S. 63, 68 (1966); *Kimbell Foods, Inc.*, 440 U.S. at 729; *Bynum*, 770 F.2d at 567. Because of traditional policies regarding the state's interest in protecting its citizens, arguably a state has an interest in having its own laws applied to torts occurring within or related to that state. This interest does not arise, however, in a consideration of a government contract defense; such a consideration concerns solely the relationship between a contractor and the federal government. The state has neither interests in, nor connections with, the litigable issues involved in the government contract defense.

III. CONCLUSION

For the reasons stated above, *amicus curiae* respectfully urges this Court to affirm the decision of the Fourth Circuit. Additionally, *amicus curiae* proposes that this Court adopt the *Yearsley*-type government contract defense as federal common law.

Respectfully submitted,

HERBERT L. FENSTER

Counsel of Record

RAYMOND B. BIAGINI

RISA H. RAHINSKY

CHARLOTTE D. YOUNG

McKENNA, CONNER & CUNEO

1575 Eye Street, N.W.

Washington, D.C. 20005

(202) 789-7500

Attorneys for the Amicus Curiae

Of Counsel:

ROBIN S. CONRAD, ESQ.

NATIONAL CHAMBER

LITIGATION CENTER, INC.

1615 H Street, N.W.

Washington, D.C. 20062

(202) 463-5337

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AMICUS CURIAE

BRIEF

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19

IN THE
Supreme Court of the United States
October Term, 1986

DELBERT BOYLE, personal representative of the heirs and estate of
David A. Boyle, deceased,

Petitioner,

vs.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES
COURT OF APPEALS FOR THE FOURTH CIRCUIT

MOTION FOR LEAVE TO FILE BRIEF *AMICUS CURIAE*
and
**BRIEF FOR THE PRODUCT LIABILITY ADVISORY COUNCIL,
INC. AND MOTOR VEHICLE MANUFACTURERS ASSOCIATION
OF THE UNITED STATES, INC. AS *AMICI CURIAE* IN SUPPORT
OF RESPONDENT**

WILLIAM H. CRABTREE
EDWARD P. GOOD
THE PRODUCT LIABILITY
ADVISORY COUNCIL, INC. and
MOTOR VEHICLE MANUFACTURERS
ASSOCIATION OF THE UNITED
STATES, INC.
300 New Center Building
Detroit, Michigan 48202

MICHAEL HOENIG*
AARON D. TWERSKI
DAVID B. HAMM
HERZFELD & RUBIN, P.C.
40 Wall Street
New York, New York 10005
(212) 344-0680
Attorneys for *Amici Curiae*

*Counsel of Record

Dick Bailey Printers.

203 Richmond Avenue ■ Staten Island, New York 10302

Tel.: (212) 608-7666 — (718) 447-5358 — (516) 222-2470 — (914) 682-0848

4198

MOTION OF THE PRODUCT LIABILITY ADVISORY COUNCIL, INC. AND THE MOTOR VEHICLE MANUFACTURERS ASSOCIATION OF THE UNITED STATES, INC. FOR LEAVE TO FILE A BRIEF *AMICUS CURIAE* IN SUPPORT OF RESPONDENT.

The Product Liability Advisory Council, Inc. ("PLAC") and the Motor Vehicle Manufacturers Association of the United States, Inc. ("MVMA"), pursuant to Rule 36.3 of this Court, respectfully request leave to file a brief *amicus curiae* in general support of the respondent, United Technologies Corporation. Petitioner's counsel has not consented to PLAC and MVMA filing such a brief.

PLAC is a non-profit membership corporation formed in June, 1983, pursuant to Michigan law.¹ The principal purpose of PLAC is to submit briefs, as friend of the court, in appellate cases involving significant issues affecting the law of products liability.

MVMA is a trade organization whose members build over ninety-eight percent of all motor vehicles produced in

1. PLAC members are American Honda Motor Co., Inc., American Telephone & Telegraph, Automobile Importers of America, Inc., Bell Helicopters Textron Inc., Black & Decker Co., the Budd Co., Clark Equipment Co., FMC Corp., Fiat Auto U.S.A. and Ferrari, N.A., The Firestone Tire & Rubber Company, Fruehauf Co., Great Dane Trailers, Inc., International Playtex, Motor Vehicle Manufacturers Association of the United States, Inc., Nissan Motor Corp., Otis Elevator Co., Porsche Cars North America, Inc., Sturm, Ruger & Co., Subaru of America, Inc., and Toyota Motor Sales, U.S.A., Inc.

In a broader sense, however, all manufacturers as well as society in general are affected by the attempt to impose still further products liability in a setting that is uniquely contractual in nature, particularly where the highly sophisticated government purchaser, immune from liability, provides the product's specifications, supervises the evolution of the product, approves its design and prescribes the conditions of its use. Increased products liability of this sort introduces uncertainty and taxes the ability of the legal and economic system to respond in a healthy manner. An additional burden of newly-minted liability—here the potential for astronomical recoveries and expensive litigation against "deep pocket" and "target" defendants—implicates economic and policy concerns such as, among others, the availability and affordability of insurance; the conceivable chilling of technological innovation; and the possible bankruptcy of businesses providing employment and other useful products.

PLAC and MVMA members represent a cross-section of the business community with extensive experience regarding the products liability system applicable to ordinary consumer products. They wish to demonstrate via the attached brief why the policy rationales behind ordinary products liability are of little moment in the government contracts area. Further, they will show that problems and limitations inherent in general design litigation are magnified exponentially in the field of military equipment contracts. Accordingly, they request leave to submit this brief as *amici curiae* to urge the continued recognition of the distinction between ordinary products liability and the tort law applicable to government contracts.

WHEREFORE, it is respectfully requested that PLAC and MVMA be granted leave to file a brief *amicus curiae*.

Dated: New York, New York
May 20, 1987

Respectfully submitted,

MICHAEL HOENIG
Counsel of Record for
The Product Liability
Advisory Council, Inc.
and Motor Vehicle
Manufacturers Association
of the United States, Inc.

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No. 86-492

IN THE
Supreme Court of the United States
October Term, 1986

DELBERT BOYLE, personal representative of the heirs and
estate of David A. Boyle, deceased,

Petitioner,

vs.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES
COURT OF APPEALS FOR THE FOURTH CIRCUIT

BRIEF FOR THE PRODUCT LIABILITY ADVISORY
COUNCIL, INC. AND MOTOR VEHICLE MANUFACTURERS
ASSOCIATION OF THE UNITED STATES, INC.
AS *AMICI CURIAE* IN SUPPORT OF RESPONDENT

INTEREST OF THE *AMICI CURIAE*

PLAC, MVMA and their individual member companies represent a significant segment of the business community that manufactures complex products. Some members of *amici curiae* manufacture specialized military equipment or component parts pursuant to contracts with the United States government or with its military contractors. Other members are potential bidders for military procurement contracts in the future. The decision in this case will influence their exposure to products design liability and their ability to engage in such relationships with the government. Therefore, *amici* have a vital interest in the outcome of this case.

In addition, *amici's* member companies are frequently engaged in products design litigation in which the potential for liability, under modern practice, is staggering. The costs of defending lengthy suits, even when no liability is found, are enormous. In addition, expansions of tort liability create uncertainties which directly influence the availability and affordability of insurance coverage. *Amici's* members are therefore strongly interested in a law of products liability that is orderly, balanced and predictable. The outcome of this case will significantly influence the course of products design law in an area of great potential exposure with important legal, economic and social consequences.

INTRODUCTION AND SUMMARY OF ARGUMENT

The briefs by Respondent United Technologies Corporation and by *Amici Curiae* the National Security Industrial Association and others have set forth why a "military contractor" defense is necessary. They have also argued that the policies of *Feres* and *Stencel* will be substantially undermined by the adoption of the open-ended *Shaw* formulation of a defense. It is not the intention of *amici* herein to repeat these well-stated arguments. Instead, we shall demonstrate that failure to adopt the sharply focused formula for a military contractor defense set forth in *McKay v. Rockwell Int'l Corp.*, 704 F.2d 444 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984), will thrust upon the courts non-justiciable products liability issues which will inevitably result in a judicial examination of military decision making. This will occur because behind the *Shaw* version of a "government contractor" test lies a body of tort law principles demanding that the very kind of inquiry prohibited by the *Feres-Stencel* doctrine be undertaken. Furthermore, we shall demonstrate that the policy rationales which support tort law recovery are, for the most part, not applicable in military procurement cases. Thus, adoption of a sharply focused "govern-

ment contractor" defense will enhance the discretionary power of the government to ready itself for war in a setting where traditional tort policies applicable to ordinary consumer products are hardly relevant.

The "government contractor" defense raises constitutional issues of the first magnitude for decision. Such issues cannot be adequately addressed or fully understood, however, without some examination of the tort doctrine which the defense seeks to displace. This brief will demonstrate that tort adjudicative principles profoundly affect the constitutional issues. Once their role is fairly depicted it becomes clear that the adoption of the *Shaw* doctrine would result in a judicial nightmare which would compromise the adjudicative process, hamper the discretion of the military and bring little in the way of positive policy benefit to the goals of a fault-based tort liability system.

The differences between the policy-implementing *McKay* test for a government contractor defense and the liability-expanding test utilized in *Shaw* are enormous. In ordinary consumer products design litigation, the jury is asked to balance the risk and utility considerations attending a particular design. This task creates, as one court has put it in the context of automobile design cases, a "troubling public policy dilemma" in that "individual juries in the various states are permitted, in effect, to establish national . . . safety standards;" it promotes the risk of "incoherence in the safety requirements set by disparate juries;" and permits a possible conflict between individual case results and "national, social and economic goals." The result of this design litigation process is imposition of a responsibility by manufacturers "of insuring vast numbers of persons involved in . . . accidents." *Dawson v. Chrysler Corp.*, 630 F.2d 950, 962 (3d Cir. 1980). One reason for these pressures is that design litigation is inherently polycentric in nature, affecting countless considerations beyond the focus and circumstances of a given

case. However acceptable such tensions may be considered in ordinary consumer product litigation, they are far less tolerable in the military equipment context.

The *Shaw* test magnifies these dangers because it bottoms its formulation not only upon what the contractor actually knew but upon the risks and design alternatives it *should have known* and upon the military's specific rejection of each alternative. This thrusts courts and lay juries into the midst of the starkest of political and non-justiciable questions.

Moreover, a "should have known" test for liability misunderstands the inherently political nature of the selection of a government contractor. Often, contractors are selected by the knowledgeable government not because they "know the most" about safety or all possible design alternatives, but because they do the best job for the price in precisely implementing the government's design specifications. When contract norms allow the sophisticated and powerful government to protect and balance all competing interests, including safety, by stipulating the contract terms, then imposition of open-ended and uncertain tort liability upon the contractor is not in the public interest.

The policy rationales of "enterprise liability," "deterrence of misconduct," "representational factors" and "compensation" are not weighty criteria in a setting where the sophisticated government purchaser sets the design specifications, approves the design, tests the product and dictates the circumstances under which it will be used. Accordingly, the policy reasons employed by courts to extend design liability for the mass-produced consumer product do not justify such expansions of liability in the unique government contract area.

ARGUMENT

POINT I

THE *SHAW* "GOVERNMENT CONTRACTOR" TEST REQUIRES JUDICIAL EVALUATION OF MILITARY DECISION MAKING OVER A BROAD RANGE OF HIGHLY NON-JUSTICIABLE ISSUES.

In order to appreciate the kinds of issues which tort claimants would have the judiciary consider in the context of a military procurement case, it is necessary to parse the test adopted by the Eleventh Circuit in *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736, 745, 746 (11th Cir. 1985). In any case where the government contractor has had more than minimal participation in establishing the design, a government contractor will be exonerated from liability if, but only if, each of the following elements are established:

- (1) it timely warned the military of all risks associated with the utilization of the design of which it knew, *Id.*, at 746; and
- (2) it timely warned the military of all risks associated with the utilization of the design of which it *should have known*, *Id.*; and
- (3) it timely warned the military of all alternatives to the design in question of which it knew, *Id.*; and
- (4) it timely warned the military of all alternatives to the design in question of which it *should have known*, *Id.*; and
- (5) it establishes that the warning of each of the above factors was of sufficient clarity to permit the military to make a fully informed choice as to the dangers and benefits which attend each risk or alternative design, *Id.*; and
- (6) that in determining whether (5) was met the court is to gauge the military's own level of relevant knowledge or expertise, *Id.*; and

(7) it establishes that the military authorized the contractor to proceed with the allegedly dangerous design, *Id.*; and

(8) in establishing (7) the contractor is not absolved from liability by the military's waiver of warnings or blanket approval of a product design; instead the contractor must enumerate all risks and all feasible alternative designs and they must be specifically rejected by the military, *Id.*, at 746, n. 18.

The mere enumeration of the *Shaw* factors necessary to establish such a "government contractor" defense is daunting. When one, however, analyzes each of the factors under the prism of tort doctrine it becomes abundantly clear that the *Shaw* formulation is nothing short of bizarre.

A. Design Alternatives In The Military Setting—Beyond The Limits Of Compliance.

The *Shaw* formulation demands that the government contractor notify the military of alternative designs to the product in question. It is required to do so both for design alternatives of which it knew and those of which it should have known. The demand simply cannot be met. Its formulation evidences ignorance with regard to fundamental doctrine in product liability law.

In order to establish whether a design is defective, the overwhelming majority of American courts have adopted "the risk-utility balancing" standard as the governing rule. As Professors Henderson and Twerski have noted in their casebook, *Products Liability: Problems and Process* (Little, Brown & Co., June 5, 1987), the design claim presents difficulties in defining "defectiveness" that are far more complex than are presented in the case of manufacturing defect. They say:

If the plaintiff can demonstrate that a particular product unit came off the assembly line with a manufacturing defect that made it significantly more dangerous than

other similar units, then one could conclude that the defect rendered the product legally unacceptable. In effect the manufacturer was the author of the standard (the intended design) against which the allegedly defective unit is measured. In a . . . design defect case, the individual unit is exactly what the manufacturer wanted it to be. . . . In essence, the plaintiff's argument is *that the design fails to measure up to some hitherto adoptable, but as yet unadopted standard. In practical terms, the plaintiff must hypothesize an alternative safer design and the court must find the hypothetical alternative to be a preferred substitute for the offending product.* Henderson and Twerski, *Product Liability: Problems and Process* at 508 (Emphasis added).³

To decide whether a hypothetical design alternative should have been adopted, the courts have utilized risk-utility balancing as the method for deciding whether the manufacturer's design choice was economically efficient and socially desirable or whether a better choice should have been made. See *Prentis v. Yale Mfg. Co.*, 421 Mich. 670, 365 N.W.2d 176 (1984); *Voss v. Black & Decker Mfg. Co.*, 59 N.Y.2d 102, 463 N.Y.S.2d 398, 450 N.E.2d 204 (1983); *Wilson v. Piper Aircraft Corp.*, 282 Or. 61, 577 P.2d 1322 (1978); *Troja v. Black & Decker Mfg. Co.*, 62 Md.App. 101, 488 A.2d 516, cert. denied, 303 Md. 471, 494 A.2d 939 (1985); Model Uniform Product Liability Act, §104(B), 44 Fed. Reg. 62,714 *et. seq.* (1979). The vast

3. Numerous authorities have similarly described the role of risk-utility balancing in design defect litigation. See, e.g., Birnbaum, *Unmasking the Test for Defect: From Negligence [to Warranty] to Strict Liability to Negligence*, 33 Vand. L. Rev. 593 (1980); Epstein, *Product Liability: The Search for the Middle Ground*, 56 N.C. L. Rev. 643 (1978); Henderson, *Renewed Judicial Controversy over Defective Design: Toward the Preservation of an Emerging Consensus*, 63 Minn. L. Rev. 773 (1979); Hoenig, *Product Designs and Strict Tort Liability: Is There a Better Approach?*, 8 Sw. U.L. Rev. 109 (1976); Keeton, *Products Liability and the Meaning of Defect*, 10 Cum. L. Rev. 293 (1979); Powers, *The Persistence of Fault in Products Liability*, 61 Tex. L. Rev. 777 (1983).

majority of cases have utilized the criteria suggested by Dean Wade in his classic article, *On the Nature of Strict Tort Liability for Products*, 44 Miss. L.J. 825, 837-38 (1973), to help guide the balancing process. They are:

- (1) The usefulness and desirability of the product—its utility to the user and the public as a whole.
- (2) The safety aspects of the product—the likelihood that it will cause injury, and the probable seriousness of the injury.
- (3) The availability of a substitute product which would meet the need and not be as unsafe.
- (4) The manufacturer's ability to eliminate the unsafe character of the product without impairing its usefulness or making it too expensive to maintain its utility.
- (5) The user's ability to avoid danger by the exercise of care in the use of the product.
- (6) The user's anticipated awareness of the dangers inherent in the product and their avoidability, because of general public knowledge of the obvious condition of the product, or of the existence of suitable warnings or instructions.
- (7) The feasibility, on the part of the manufacturer, of spreading the loss by setting the price of the product or carrying liability insurance.⁴

Whether a design of military equipment should or should not have been safer depends on identifying the role that each of the aforesaid factors will play in the ultimate design decision.

4. Scholars have expanded considerably on Dean Wade's seven factors. See, e.g., Fischer, *Products Liability: The Meaning of Defect*, 39 Mo. L. Rev. 339, 359 (1974) (fifteen factors to be considered); Shapo, *A Representational Theory of Consumer Protection: Doctrine, Function and Legal Liability for Product Disappointment*, 60 Va. L. Rev. 1109, 1370-71 (1974) (thirteen factors).

In designing military material, whether it be a combat airplane, a sophisticated tank or a nuclear submarine, literally thousands of design decisions are made *before* the product is completed. Alternative designs can be substituted for the design actually utilized at almost every stage of product development. This is true for individual parts as well as the combinations among different parts. Such decisions are, in fact, made by product designers and engineers as product development takes place. What is so frightening about the *Shaw* formulation is that it demands the government contractor to articulate all the risks and benefits of all possible alternative designs and combination of alternative designs, and further requires that the government specifically reject every alternative except the one actually chosen. Only then will the contractor be assured that it can successfully assert the government contractor defense. Under this open-ended standard, it is no exaggeration to say that product development would become so burdensome a process that military procurement would be seriously endangered.

Nor is this the only consequence of the adoption of the *Shaw* formula. Commentators have noted that design litigation is highly polycentric in nature. See Henderson, *Judicial Review of Manufacturers' Conscious Design Choices: The Limits of Adjudication*, 73 Colum. L. Rev. 1531 (1973); Twerski, *Seizing the Middle Ground Between Rules and Standards in Design Defect Litigation: Advancing Directed Verdict Practice in the Law of Torts*, 57 N.Y.U. L. Rev. 521 (1982). Design cases question the decisions made, not only with regard to one aspect of the design but also how other aspects are affected. Thus, factors such as function, safety, maintenance, repair, durability, cost, etc., must all be accounted for before the final design approval is made. As one emphasizes one factor, e.g., maintenance, one may have to compromise another factor, e.g., safety. This weighing and balancing

process puts an inordinate strain on the judicial process even in the context of a simple consumer product design. *Id.* In the field of complex military equipment it becomes unworkable. Unlike consumer products, one trial expert's version of allegedly greater safety is not and cannot be the sole standard for military equipment design. Durability, ease of repair and ease of maintenance, for example, become values of extraordinary importance and possess their own safety implications. To believe that this balancing process can be articulated for all alternative designs of complex defense equipment, where military discretion influences the focus of values, is to indulge in fantasy.

In short, *Shaw* virtually mandates that all government contractors, in order to insulate themselves from otherwise catastrophic liability, engage in a design evaluation process that is not only time-wasting and prohibitively expensive but also one to which they can never fully conform. It is one thing to ask a manufacturer to defend its own final design. It is quite another to predicate liability on the manufacturer's duty to invite rejection of every possible design alternative that could have been adopted but was not. Once the decision has been made that the government is entitled to purchase military equipment free from the stricture of civilian product liability norms, then the courts are not free to select a form of the defense which literally destroys the ability of the government and the contractor to function in a sensible and efficient manner.⁵ *Shaw* has done so in a totally unacceptable fashion.

5. Commentators have noted that when courts recognize that product liability law cannot effectively reach some product-related activities, the "second best" solution may be to restrict recovery even in areas which could theoretically be reached by law. Failure to restrict recovery may encourage conduct which would not be economically efficient. See Henderson, *Extending the Boundaries of Strict Products Liability: Implications of the Theory of the Second Best*, 128 U. Pa. [Footnote continued on the following page]

Because the *Shaw* standard requires a defendant contractor to prove that it warned about a major element of plaintiff's case-in-chief -- the *post-hoc* hypothetically safer design alternative -- the *Shaw* test imposes a burden upon the manufacturer more onerous than that found in ordinary product design litigation. With the exception of only two jurisdictions, it is the plaintiff's burden to establish that a given product design does not meet risk-utility standards and that the product is unreasonably dangerous.⁶ A manufacturer does not carry the burden of proof to establish that its product is *not* defective. In the context of the *Shaw* formulation, however, a defendant will bear the burden of proof that any design which the plaintiff hypothesizes to provide greater safety was considered and rejected by the military. Nothing but the limits of imagination prevent claimants from proposing "safer" design alternatives. Defendants must be prepared under *Shaw* to carry the burden of proof that each such alternative was considered and rejected.

That this will, in fact, be the defendant's burden is clear once one comprehends how design defect litigation

L. Rev. 1036, 1036-38, 1081-85 (1980). In the case of defectively designed military equipment, liability cannot be imposed on the government because *Feres* mandates immunity. The supposed "second best" solution cannot be to seek out the civilian manufacturer, when to do so would cause the manufacturer to engage in wasteful and inefficient conduct which will demand that tens of thousands of so-called "safer" designs be consciously considered and officially rejected.

6. California and Alaska appear to be the only two states which shift the burden of proof to the defendant to establish that a product design was not defective utilizing risk-utility criteria. See *Barker v. Lull Engineering Co.*, 20 Cal.3d 413, 573 P.2d 443, 143 Cal. Rptr. 225 (1978) and *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871 (Alaska 1979). See also, Schwartz, *Foreward: Understanding Products Liability*, 67 Calif. L.Rev. 435, 468 (1979).

proceeds -- often many years after the fact. Litigation tactics dictate that the plaintiff seek to establish a standard for product safety which would have prevented the plaintiff's injury had the manufacturer complied with it. If the plaintiff does not take this tack, the case will fail for lack of sufficient proof of causation. *See generally*, Prosser and Keeton, *The Law of Torts*, §41 at 263-72 (5th Ed. 1984). The plaintiff thus attacks with pinpoint precision, suggesting the specific design change that would have avoided his particular accident. To defend under the *Shaw* test a manufacturer will be required to demonstrate that the particular design subjectively conjured up by plaintiff's expert well after the accident had, in fact, been considered and rejected by the military. Because the plaintiff has the luxury of focusing on his particular injury and its preventability, plaintiff can and will hypothesize hindsight design modifications that could have been useful in preventing his particular injury. If plaintiff hits on even *one alternative design* that was not fully considered, the defendant has lost the government contractor defense. Indeed, the specter of claimants conducting costly and extensive pretrial discovery in order to "find" the one design alternative not considered or rejected cannot be excluded. All that then stands between the plaintiff and recovery is the vagaries of jury discretion on the "reasonableness" of the plaintiff's tailor-made alternative design. Cumulatively, this dynamic would apply to all plaintiffs in all accidents involving numerous designs and countless hypothetical alternatives. No defendant can reasonably bear such a crushing burden of proof in its cumulative setting. Rather than a defense which provides a military contractor with some sense of security, the *Shaw* test presents a minefield which all but the very lucky will be unable to cross.

There is yet another fatal flaw in the *Shaw* government contractor formulation. The court struggles, as it must, with the question of the sufficiency of the warning

that the government contractor is required to give to the military. The *Shaw* court concludes:

Whether the contractor's counsel on these matters is sufficiently specific and complete to permit an informed decision on the part of the military is a matter of fact for the trial judge to determine. In making the assessment of the sufficiency *the court may take into account evidence that goes to the military's own level of relevant knowledge and expertise.* 778 F.2d at 746 (Emphasis added, footnotes omitted.)

It was, of course, absolutely necessary for the *Shaw* court to account for the level of knowledge and expertise of the military. If the military had independent knowledge of the risks and alternative design, then the government contractor breached no duty in failing to relay that information. Or phrased in another way, the failure to inform the government was not the proximate cause of the allegedly defective design, since the military, with knowledge of the risks and alternative, in fact chose the more dangerous design.

Given the structure of the defense as formulated in *Shaw*, there should be little question as to how real-world litigation will play out. It will be to plaintiff's advantage in each case to question the level of the military's "relevant knowledge and expertise". There is simply no way of determining whether the military fully considered the alternative designs and permutations thereof without analyzing the way military decisions are made and probing the values which the military ascribes to each of the risk-utility factors. Defendant contractors, in attempting to show that the military did in fact knowingly reject a whole host of design alternatives, will argue that the military had already made a set of *a priori* decisions to live with a given level of risk to better the performance of the equipment.

Very simply, the evil which *Feres-Stencel* sought to avoid will come front and center in design litigation.

Soldiers will indeed question both the competence and the value structure of military decision making in order to establish that *in fact the military made no decision*, and defendant contractors will necessarily have to examine the values behind military decision making in order to demonstrate that the military did, in fact, *decide to disregard alternative designs*. In practical terms, of course, all this would potentially require extensive pretrial discovery of government employees, managers and documents upon subjects of possible sensitivity or national security. The result would be involvement of key government officials in private litigation, despite immunity from liability, thereby diverting officials from security tasks on pending and future military projects. Were such discovery unavailable, the unfairness to the contractor is manifest.

Finally, this Court should be aware of the consequences of the government contractor's failure to meet the burden of proof that it had warned the military of all alternative designs and that the military had "clearly authorized the contractor to proceed with the dangerous design". The fault of the military, even if substantial, will play no role in the case. The desire of the military to short-circuit the design development process will be of no moment. The defendant contractor will bear the full brunt of liability. The government, being immune from suit, will bear no percentage of the harm. The doctrine of joint and several tort liability, which still governs in the large majority of jurisdictions, will impose the full cost of the injury upon the government contractor. The Second Circuit, in its ringing endorsement of the government contractor defense, recently took careful note of the harsh impact of judgments in military contractor cases. The court said:

We also note that, absent the shield of the military contractor defense, the legal exposure of the contractor would be much greater than the exposure of a manufac-

turer that sells to a private corporation that uses its product. In the latter case, the user corporation will also be a defendant and bear some or all of the exposure. Under *Feres v. United States*, 340 U.S. 135 (1950), and *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666 (1977), however, the government cannot be sued and need not even cooperate with the contractor in defending personal injury litigation. Obtaining discovery from the government as a non-party might be difficult or even barred by a claim of national security privilege. The military contractor thus faces the great exposure of being the sole "deep pocket" available. *In re "Agent Orange" Product Liability Litigation*, Docket No. 85-6143 (2d Cir., Apr. 21, 1987), slip op. 8-9.

If ever a category of cases required a narrowly structured and well-defined formula to protect the integrity of military decision making, it is the military equipment design cases. They cannot be litigated without opening up for discussion the most fundamental of value judgments for court-based examination. *Shaw* inexorably leads to this result and must therefore be rejected as wholly inconsistent with the basic political doctrine outlined in *Feres*.

B. *The Shaw Requirement that the Government Contractor Warn the Military of Risks and Alternatives of Which It Should Have Known Would Seriously Hamper Military Procurement and Would Present Non-Justiciable Issues to the Courts for Litigation.*

Not only does *Shaw* mandate that the government contractor warn the military of all risks and design alternatives of which it knew, it also mandates that the military be warned of all risks and alternatives which the government contractor *ought to have known*. In explaining its requirement that the contractor warn the military of risks "reasonably known" by it, the *Shaw* court said:

A risk is reasonably known when it is either actually known, or reasonably ought to be known given good

design practice in the industry. Similarly, an alternative is reasonably known if it is either actually known, or reasonably ought to be known given good design practice in the industry. 778 F.2d at 746.

The large majority of cases that have confronted the question of whether a government contractor has a duty to warn of risks of which it "should have known" have flatly rejected such a duty. See *Bynum v. FMC Corp.*, 770 F.2d 556, 575-76 (5th Cir. 1985); *Tillett v. J.I. Case Co.*, 756 F.2d 591, 599 (7th Cir. 1985); *Koutsoubos v. Boeing Vertol*, 755 F.2d 352, 354 (3rd Cir. 1985), cert. denied 106 S.Ct. 72 (1986); *McKay v. Rockwell Int'l Corp.*, supra, 704 F.2d 444, 451; *In re "Agent Orange Product Liability Litigation"*, Docket No. 85-6163 (2d Cir., April 21, 1987) (slip op. 5-11). As the court in *Bynum* noted, to impose such a duty "would compel the military contractor to reevaluate the design specifications furnished by the government and to engage in testing not required under the government contract. Such reevaluations and additional testing would mean delay and an increase in defense costs not contemplated by the military authorities." 770 F.2d at 576. Indeed, the *Shaw* test would exponentially increase the obligation of the government contractor. Since *Shaw* requires the contractor to warn about all alternative designs of which it should have known, it is required to account for knowledge and technology for each such hypothetical design. Because the military contractor can only assure itself of immunity under *Shaw* by specifically addressing each alternative design for all parts which could theoretically be made "safer," the contractor is forced to seek out such knowledge for an untold number of design permutations.

The refusal of most courts to adopt the *Shaw* formulation on this aspect of the defense is supported by sound tort doctrine. No question is more difficult to determine than what the state of knowledge should have been at

any given point in time. Indeed, when the question is asked whether "industry knowledge" as applied to a conceivable alternative design was available, the answer may be impossible to determine if a given point of time is identified as crucial to the inquiry. Leading commentators have noted that "knowledge", a fortiori "applied knowledge," is not a point on a graph. Rather, it is the accumulation of information, expertise and experience. It does not come like a "bolt out of the blue" but rather is a process of slow accretion. Dean Page Keeton observes that "the task of identifying . . . the risks of which a reasonable man could justifiably be unaware but that were scientifically knowable is an almost impossible one". Keeton, *Products Liability - Inadequacy of Information*, 48 Tex. L. Rev. 398, 408 (1970). Similar conclusions were drawn by the New Jersey Supreme Court in *Beshada v. Johns-Manville Prods. Corp.*, 90 N.J. 191, 447 A.2d 539 (1982). In that case the court applied strict liability against an asbestos manufacturer, holding a manufacturer liable for scientifically unknowable risks because the court found that identifying what scientific knowledge could have been available at the time the product was manufactured was a non-justiciable question.⁷ The court said:

Scientific knowability, as we understand it, refers not to what in fact was known at the time, but to what *could have been* known at the time. In other words, even if no scientist had actually formed the belief that asbestos was dangerous, the hazards would be deemed "knowable" if a scientist could have formed that belief by applying research or performing tests that were available at the time. Proof of what could have been known will inevitably be

7. The New Jersey court later limited its holding solely to asbestos cases. See *Feldman v. Lederle Laboratories*, 97 N.J. 429, 454-56, 479 A.2d 374, 387, 388 (1984); *Gogol v. Johns-Manville Sales Corp.*, 595 F. Supp. 971 (D.N.J. 1984).

complicated, costly, confusing and time-consuming. Each side will have to produce experts in the history of science and technology to speculate as to what knowledge was feasible in a given year. We doubt that juries will be capable of even understanding the concept of scientific knowability, much less be able to resolve such a complex issue. Moreover, we should resist legal rules that will so greatly add to the costs both sides incur in trying a case. 447 A.2d at 548.

Similar speculation would inhere in the *Shaw* "ought to have known" formulation. On a cumulative basis, given the thousands of design parts involved in complex military equipment, the tendency to so speculate would be overwhelming.

It is especially inappropriate to subject the intractable "should have known" question to judicial scrutiny in a government contractor case. Just as selection by the military of a particular design is essentially a political decision exclusively within the discretion of the Executive, the choice of which contractor to employ is similarly a decision beyond judicial review. Military contractors are not chosen solely on the basis of the lowest competitive bid. Many factors are involved in selecting a particular contractor. As the *amicus* brief for the National Security Industrial Association has observed, after the competing contractors submit their final proposals, the bids are "broken down into a large number of technical and management considerations", and each "is then assigned for evaluation to a small number of technical or management experts who in the aggregate comprise an evaluation team which may number several hundred". [Quoting from Blue Ribbon Defense Panel, *Report to the President and the Secretary of Defense on the Department of Defense* 71 (1970).] Each team combs through the proposals and makes rankings, which are then assigned pre-determined weights, summed up, and forwarded for review to a

military selection board. Based upon these scores and other variables, such as past performance and price, the board selects a contractor and the contract is awarded. *Id.*; See *Amicus Curiae* Brief of National Security Industrial Association, at 8-9 ("Selection of Contractor").

The capabilities of a bidding contractor for technological innovation and conceptual creativity are factors that must perforce enter into the selection process. For products with which the military has long-term experience, less weight may be placed on these factors, with greater weight placed on such factors as past performance and timeliness of delivery. In products which require greater technical innovation, the military may opt for a contractor with better research and development capabilities. These choices of relative contractor strengths are highly political in nature and go to the very heart of military discretion. Yet, by holding a contractor to a "should have known" standard of knowledge, *Shaw* in effect places under scrutiny the decisional process which selected one contractor over another. It is certainly possible that one or more members of the industry had knowledge and capabilities superior to the contractor actually chosen to perform a particular contract. But the sensitive weighing process which determined that a given contractor be selected takes technological expertise into account. The "should have known" question emphasizes by indirection only one aspect of another contractor's capabilities, and substitutes it for the political decision made by the military upon a host of variables. Such piecemeal dissection of the contractor selection process is a direct affront to military discretion. *Cf.*, *Gilligan v. Morgan*, 413 U.S. 1, 10 (1973) (military equipment decisions are essentially professional judgments).

If the military has an absolute right to purchase equipment from whom it sees fit and when it sees fit, then a government contractor cannot be subjected to a standard of knowledge different than it actually possessed.

The only way in which a contractor can cope with the "should have known" duty posited in *Shaw* is to delay its performance so that it can enhance its own evaluative capabilities -- in short to become something other than the entity with whom the government contracted. However, this cannot be accomplished without denying to the military that which is its inherent political right, i.e., to make manufacturing decisions at the exact time and with the contractor it chooses.

There is yet another aspect that makes it inappropriate for a court to place under judicial scrutiny that which the defendant "ought to have known". This Court has recognized that not all facets of product liability litigation should be forced into the rubric of tort law. When the relation between the parties is such that contract norms allow the parties to fully protect their interests through contract, then open-ended tort litigation is unwise and not in the public interest. *East River Steamship Corp. v. Transamerica Delaval Inc.*, 106 S.Ct. 2295 (1986). When the military contracts with a private contractor, it obviously has the bargaining power to demand that the contractor seek both confirmation of its design decisions and the development of any additional knowledge. This can be done by demanding that industry consultants or academic experts be brought into the design process. "Safety" is plainly a subject amenable to this process. Very simply, the highly specialized and expert military procurement offices of government are not "babes in the woods" who enter into procurement contracts with no knowledge of the problems which attend advancing technology.

Courts should not be called upon to make hair-splitting determinations as to what could or should have been "known" at any given point in time, when the military could by direct contractual negotiation have assured itself that it was receiving the very information it desired. The moment the government contractor is charged with knowledge that it did not in fact have, the courts

will become embroiled in the speculative controversy of determining "scientific knowability" at a particular point in time. See *Beshada, supra*, 447 A.2d at 548. Since the military can contractually assure itself of that level of knowledge which meets its demands, this highly complex issue should not become the focal point of government contract litigation.⁸ In short, the highly sophisticated government purchaser can contract for as much "safety" as it desires. The blame for the decisions made or the failure to contract for the ultimate in safety should not, by hindsight, be laid at the contractor's doorstep.

8. We take note of the fact that plaintiffs have couched their arguments to recover against government contractors in causes of action based either in negligence or strict liability. In cases based on defective design, the test for liability in the vast majority of jurisdictions requires risk-utility balancing of the actual design as against alternative designs. See authorities n.1, *supra*. Thus, the arguments set forth throughout this brief are applicable to any action for a defective design whether it be negligence or strict liability. The process for determining "defectiveness" is identical in both and will demand the same kind of inquiry. Pure strict liability would hold the manufacturer liable for knowledge or technology that was not available at the time the product was designed and distributed. See Wade, *On the Effect of Knowledge Unavailable Prior to Marketing*, 58 N.Y.U.L. Rev. 734 (1983). This position would be incompatible with even the *Shaw* formulation or even with existing strict products liability law in virtually all the states. In any event, it should be clear that should strict liability be applied against government contractors, the problems that we set forth in the brief would be increased exponentially. At best manufacturers would refuse to manufacture to government specifications without extensive and laborious testing until they could be assured that undesirable consequences would not occur and potentially astronomical liability would be minimized. At worst they would refuse to manufacture military equipment at the cutting edge of technology because they could never be assured that subsequent data or technology would prove them wrong.

POINT II

THE POLICY RATIONALES WHICH TRADITIONALLY SUPPORT TORT LIABILITY DO NOT SUPPORT THE IMPOSITION OF LIABILITY AGAINST A MANUFACTURER WHOSE DESIGN OF MILITARY EQUIPMENT WAS APPROVED BY THE RELEVANT GOVERNMENTAL AGENCY.

Product liability law from its very inception has operated at the border between the law of contract and tort. Early developments limited liability to parties in privity and permitted free use of contractual disclaimers in the absence of fraud, duress or incompetence. See Epstein, *Modern Products Liability Law* 49 (1980); Bohlen, *Liability of Manufacturers to Persons Other than Their Immediate Vendees*, 45 L.Q. Rev. 343 (1929); Jeanblanc, *Manufacturer's Liability to Persons Other than Their Immediate Vendees*, 24 Va. L. Rev. 134 (1937). The tort universe changed radically with the advent of such cases as *MacPherson v. Buick Motor Co.*, 217 N.Y. 382, 111 N.E. 1050 (1916) and *Henningsen v. Bloomfield Motors Inc.*, 32 N.J. 358, 161 A.2d 69 (1960). Spurred by the well-founded belief that consumers bereft of adequate bargaining power could not protect themselves against powerful corporate interests, the courts sought to provide protection to the consumer through the law of torts. The expansion of tort law protection was also supported by the direct marketing of consumer products through mass media advertising. See e.g., *Rogers v. Toni-Home Permanent Co.*, 167 Ohio St. 244, 147 N.E.2d 612 (1958); Cowan, *Some Policy Bases of Products Liability*, 17 Stan. L. Rev. 1077, 1086 (1965).

Notwithstanding the dramatic changes that have taken place in the law, product liability law continues to recognize that contract norms may nevertheless play a significant role in limiting liability for manufacturers.

Priest, *A Theory of the Consumer Product Warranty*, 90 Yale L.J. 1297 (1981); Priest, *The Best Evidence of the Effect of Products Liability Law on the Accident Rate*, 91 Yale L.J. 1386 (1982). This Court in *East River S.S. Corp.*, *supra*, took note of this phenomenon when it said:

Products liability grew out of a public policy judgment that people need more protection from dangerous products than is afforded by the law of warranty. See *Seely v. White Motor Co.*, 63 Cal. 2d 9, 15, 403 P.2d 145, 149 (1965). It is clear, however, that if this development were allowed to progress too far, contract law would drown in a sea of tort. 106 S.Ct. at 2299-2300.

No stronger case exists for giving dominance to contract considerations over tort than that of military equipment contracts. The power of the sophisticated government purchaser to control each and every aspect of the production and design of the product is total and complete. This power is not merely theoretical, but plays out in the daily administration of military equipment contracts. It is no exaggeration to state that government oversight pervades every aspect of the contract from the development of the initial concept to limitations on testing to quality control. If the military sees fit to call in consultants, experts and advisors from every imaginable source of expertise it is totally free to do so. It frequently chooses to do so. Furthermore, the parties who are seeking the protection of tort law in this case are not adversaries or strangers to whom government owes no responsibility. Indeed, the relation of the government to its soldiers is at the very core one of *parens patriae*. The government has the right to control the conduct of the soldier in a way which cannot be likened to any domestic relationship. It speaks to him and for him. It is also its duty to protect him—a duty which it obviously takes seriously. As a sophisticated purchaser of equipment, to whom expertise is readily available, the government's contract specifications should control.

We do not mean to suggest that if state tort law were to govern these cases, liability might not attach against the military. That is not the point. Rather, in examining the substance of a government contractor defense, it is helpful to place this case in its rightful perspective. This is not a case where, absent tort law, the parties to the bargain cannot reach a consensus as to safety because of unequal bargaining power, unconscionable disclaimers, inadequate access to necessary expertise and technological information or over-promotion of product quality due to mass media advertisement. The government of the United States is the party with superior bargaining power and can demand that which it desires. The engine that drives domestic tort law does not have sufficient power to wrench this case out of its contractual setting.

In this regard, it is significant to observe that the Model Uniform Product Liability Act [44 Fed. Reg. 62,714 (1979)], drafted following a massive research and review of products liability law, incorporates a government contractor defense which bears no resemblance to the *Shaw* formulation. The Model Act unequivocally provides at Section 108(C):

When the injury-causing aspect of the product was, at the time of manufacture, in compliance with a mandatory government contract specification relating to design, *this shall be an absolute defense and the product shall be deemed not defective under Subsection 104(B)*, [design] or, if the specification related to warnings or instructions, under Subsection 104(C) or 105(A). (Emphasis added).

Since the purpose of the Model Act was to balance competing interests in the products litigation process, including the assurance of reasonable compensation to injured parties, the Act's adoption of the defense in this unequivocal form appears to be highly persuasive.

A careful examination of the primary rationales which courts and scholars have recognized as supporting

tort recovery in products liability cases will reveal that these theoretical justifications are either not present or substantially diminished in military procurement cases.

A. Enterprise Liability.

A major premise of modern product liability law is that the price of a product should reflect the cost of accidents caused by the use of the product. Increased prices will discourage consumers from purchasing risky products and thus lower accident rates. Klemme, *The Enterprise Theory of Torts*, 47 U. Colo. L. Rev. 153, 158 (1976); Henderson, *Coping With the Time Dimension in Products Liability*, 69 Calif. L. Rev. 919, 931-939 (1980). In *McKay v. Rockwell International Corp.*, *supra*, 704 F.2d at 451-452, the court made it clear that this rationale has little meaning in the case of military equipment contracts:

However, the [enterprise liability] rationale rests on two assumptions. These are that consumers underestimate the risks involved in a product's use, and will therefore overconsume the product unless the product's price reflects the cost of accidents, and that demand for a product is elastic—that is, that it will decrease as the product's price rises. [citation omitted]

Neither of these assumptions applies in the usual case to sales of military equipment to the government. First, the armed forces are aware of most, although sometimes not all, the risks involved in using military equipment. They undertake a constant program of testing and evaluating such equipment. Higher prices would not affect significantly their awareness of the safety risks involved in the use of the equipment. In addition, within broad limits demand is not elastic for military equipment. Rather, government purchases of military equipment are planned in advance, and are based on considerations of military and political strategy, as well as on the government's assessment of the risks and benefits involved in the use of the equipment. Thus, including the cost of accidents in the

price of sales to the military would probably have little or no effect on product sales. Meeting adequately the needs of national defense, not accident costs, is the ultimate standard by which purchases of military equipment must be measured.

In *Bynum v. FMC Corp.*, *supra*, 770 F.2d at 571-72, the court agreed with *McKay* as to the foregoing and added that: "[T]he loss-spreading goal of strict liability is built on the presumption that the manufacturer sells a large volume of products to a large number of customers. This is simply not the case with respect to military equipment purchased by the government." Thus, the effect of strict liability would shift the entire cost of the accident to the contractor "or, more likely, the government, thus subverting the *Feres-Stencel* doctrine." *Id.*, at 572.

B. Market Deterrence.

An oft-stated reason for imposing tort liability based on a risk-utility standard is that it will deter manufacturers from marketing unsafe products by encouraging the use of cost-justified safety features. See *Escola v. Coca-Cola Bottling Co. of Fresno*, 24 Cal.2d 453, 461, 150 P.2d 436, 440 (1944) (Traynor, J. concurring); Owen, *Rethinking the Policies of Strict Product Liability*, 33 Vand. L. Rev. 681, 709 (1980). The courts that have considered this rationale in the context of government contractor cases have found it seriously wanting. See *Bynum v. FMC Corp.*, *supra*, 770 F.2d at 572. The court in *McKay v. Rockwell Int'l Corp.*, *supra*, 704 F.2d at 452, made short shrift of the argument:

[I]n the case of military equipment, as noted above, the demand for such equipment is quite inelastic. Moreover, the government, the sole purchaser of most military equipment, has both the ability to recognize safety problems in military equipment and to negotiate with suppliers to remedy those problems. It constantly balances the safety of the article against the imperatives of national defense.

Strict liability would no doubt increase defense costs but would do little not already being done to increase the use of safety features in military equipment.

The deterrence rationale is further weakened by the recognition by government contractors that when they fail in performance they are subject to being dropped or suspended from further contracting. Given the huge dollar value of military contracts and the heavy dependency by particular companies on them for profitability, the pressure for optimal performance and participation in the design process is very great. It is highly unlikely that product liability judgments will add significantly to the internal pressures that exist for high level performance. Unlike the consumer market which because of the "invisible hand of the market" may need cost internalization to create the deterrence, the military as an informed and continuous purchaser is likely to gain little in the way of additional deterrence by tort judgments. Of course, deterrence in the form of products liability already exists with respect to manufacturing defects caused by a contractor's non-compliance with the contract specifications.

C. Representational Rationale.

A large number of product liability cases have premised liability on the representational role played by advertising and marketing. The argument is that consumers are led to believe, via an implied representation, that the products they purchase will not be unreasonably dangerous or, further, that consumers may be led to utilize the products beyond their legitimate use by suggestive advertising. See, e.g., *Greenman v. Yuba Power Products*, 59 Cal.2d 57, 27 Cal. Rptr. 697, 377 P.2d 897 (1962); *Leichtamer v. American Motors Corp.*, 67 Ohio St.2d 456, 424 N.E.2d 568 (1981); Shapo, *A Representational Theory of Consumer Protection: Doctrine, Function and Legal Liability for Product Disappointment*, 60 Va. L. Rev. 1109 (1974).

It is clear, however, that direct marketing plays no role whatsoever either in the purchase or use of military equipment products. Any expectations of safety that a soldier may have are more properly directed toward the government. *Bynum*, 770 F.2d at 572. This rationale must simply be eliminated from consideration in these cases. See *McKay*, 704 F.2d at 453; *Bynum*, 770 F.2d at 572.

D. Compensation.

Finally, the tort goal of compensation is not totally frustrated by recognizing a "government contractor" defense. The Veteran's Benefit Act provides what this Court has called "a generous military compensation scheme" and "a swift, efficient remedy." *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666, 672-673 (1977). The injured serviceman is granted protection that is not available to the injured domestic consumer. His recovery does not depend on protracted wrangling over fault and causation. Admittedly, the measure of recovery is not comparable to that awarded in domestic tort actions. Nonetheless, the compensatory goal of tort law is much muted in military injury cases. See *McKay*, 704 F.2d at 452; *Bynum*, 770 F.2d at 572.⁹

9. In those instances where the accident fortuitously involves injury to non-military bystanders, there is no sound policy reason why the burden of compensation should fall upon the contractor. Obviously, military equipment cannot be redesigned from accident to accident. The government, as the sophisticated design specifier and determiner of the setting in which its products are used, should bear the compensatory role. See Model Uniform Product Liability Act, §108(C). *Analysis* ["[a] legislature should ensure that its own state government bears financial responsibility (either through tort law or through a compensation system) for the harm it has caused by directing that the product conform to contract specifications"].

CONCLUSION

For the foregoing reasons, PLAC and MVMA submit that the determination of the court below should be affirmed.

Dated: New York, New York
May 20, 1987

Respectfully submitted,

MICHAEL HOENIG*
AARON D. TWERSKI
DAVID B. HAMM
HERZFELD & RUBIN, P.C.
40 Wall Street
New York, New York 10005
(212) 344-0680
Attorneys for *Amici Curiae*

*Counsel of Record

WILLIAM H. CRABTREE
EDWARD P. GOOD
THE PRODUCT LIABILITY
ADVISORY COUNCIL, INC. and
MOTOR VEHICLE MANUFACTURERS
ASSOCIATION OF THE UNITED
STATES, INC.
300 New Center Building
Detroit, Michigan 48202

AMICUS CURIAE

BRIEF

3
No. 86-492

Supreme Court, U.S.

FILED

MAY 21 1987

JOSEPH F. SPANIOL, JR.

In the Supreme Court of the United States

OCTOBER TERM, 1986

DELBERT BOYLE, personal representative of the heirs
and estate of David A. Boyle, deceased,

Petitioner

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent

On Writ of Certiorari to the
United States Court of Appeals
for the Fourth Circuit

BRIEF FOR AMICI CURIAE
NATIONAL SECURITY INDUSTRIAL ASSOCIATION,
AEROSPACE INDUSTRIES ASSOCIATION,
AMERICAN GEAR MANUFACTURERS ASSOCIATION,
ELECTRONIC INDUSTRIES ASSOCIATION,
GENERAL AVIATION
MANUFACTURERS ASSOCIATION,
NATIONAL ASSOCIATION OF MANUFACTURERS,
(Additional Amici Curiae Listed on Inside Cover)

KENNETH S. GELLER

Counsel of Record

ANDREW L. FREY

PATRICIA A. MCCOY

Mayer, Brown & Platt

2000 Pennsylvania Ave., N.W.

Washington, D.C. 20006

(202) 463-2000

Attorneys for Amici Curiae

THE BOEING COMPANY,
EATON CORPORATION,
EMERSON ELECTRIC COMPANY,
FMC CORPORATION,
THE GOODYEAR TIRE & RUBBER COMPANY,
HUGHES AIRCRAFT COMPANY,
IBM CORPORATION,
ITT DEFENSE TECHNOLOGY CORPORATION,
LITTON INDUSTRIES, INC.,
LOCKHEED CORPORATION,
LTV AEROSPACE AND DEFENSE COMPANY,
MARTIN MARIETTA CORPORATION,
McDONNELL DOUGLAS CORPORATION,
MOTOROLA, INC.,
OSHKOSH TRUCK CORPORATION,
RAYTHEON COMPANY,
ROCKWELL INTERNATIONAL CORPORATION,
THE SINGER COMPANY,
TEXAS INSTRUMENTS, INC.,
AND UNISYS CORPORATION
IN SUPPORT OF RESPONDENTS

QUESTION PRESENTED

Whether and under what circumstances a contractor that has participated with the government in the design of a military weapons system or piece of military equipment should be immune from liability for damages resulting from a defect in that design.

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INTEREST OF THE AMICI CURIAE

Amici curiae are individual companies and associations of companies that produce military equipment under contracts with the Armed Forces. See Appendix, *infra*. The Court's decision in this case will govern the companies' exposure to tort liability for alleged defects in the design of such equipment and will substantially affect their working relationship with the military.

SUMMARY OF ARGUMENT

The federal government may not be sued in tort for its performance of discretionary functions, lest judicial oversight exert a chilling effect on the government's decision-making process. This concern applies with special force when the discretion relates to the national defense—a subject uniquely committed to the political branches. Accordingly, it is undoubted that decisions made by military authorities in designing military equipment—decisions that necessarily entail trade-offs between combat effectiveness, cost, speed of production, reliability, and safety of use—may not form the basis for an action under the Federal Tort Claims Act.

If a government contractor could be exposed to damages liability for design defects in military equipment, however, the purposes of this government immunity would be defeated. The military procurement process today involves a highly interactive partnership between government and contractor in which each plays an important creative role, but in which ultimate control over and responsibility for the design of the equipment or system rests entirely with the government. Thus, courts and juries would be drawn into assessing quintessentially military decisions, such as determining the “defectiveness” of a design that a plaintiff accuses of unreasonably compromising safety but that the contractor characterizes as necessary to achieve desired levels of combat effectiveness. Even worse, the threat of tort claims could distort national defense decision-making by increasing the emphasis on design safety at the expense of performance.

These considerations have led every federal appellate court that has ruled on the question to recognize that there must be an immunity defense for government contractors. Indeed, there is general agreement about the elements of that defense, which are intended to confer immunity only to the extent necessary to foster the important public policies described above. The defense applies where (1) the government established or approved reasonably precise specifications for the allegedly defective product; (2) the product was manufactured in accordance with the specifications; and (3) the contractor apprised the government of latent dangers of which it, but not the government, had actual knowledge.

Only the Eleventh Circuit is out of harmony with these principles. It bars the defense whenever the contractor has had any hand in the challenged design, unless the contractor warned the government of design risks that it knew or should have known of, and the government, exercising judgment that is both "informed" and "military," nevertheless "clearly" authorized the contractor to proceed with the dangerous design. This version of government contractor immunity fails to recognize the extent of government control over the design of military equipment, discourages needed contractor participation in the defense procurement process, and promotes adoption of cumbersome warning procedures that would improve neither procurement nor safety.

ARGUMENT

DEFENSE CONTRACTORS MAY NOT BE HELD LIABLE FOR DESIGN DEFECTS IN MILITARY EQUIPMENT MANUFACTURED PURSUANT TO GOVERNMENT SPECIFICATIONS

A. The Judiciary May Not Second-Guess Discretionary Governmental Decisions, Particularly In The Military Context

This case involves a claim for damages arising from the death of the copilot of a CH-53 Marine helicopter that crashed during military maneuvers. Petitioner con-

tends that the helicopter, which was manufactured for the Navy by the Sikorsky Aircraft Division of respondent United Technologies Corporation (UTC), was defectively designed because the copilot's escape hatch opened outward rather than inward and because the collective, when pulled up, allegedly interfered with the copilot's access to the escape hatch. Pet. App. A4.

If Sikorsky Aircraft were a branch of the Department of Defense rather than a division of UTC, a suit such as this, filed against the United States, would encounter obstacles that would preclude the imposition of damages liability. First, because petitioner's decedent was killed in an accident occurring in the course of his military service, suit would be barred by the *Feres* doctrine. See *Feres v. United States*, 340 U.S. 135 (1950). Second, even if the deceased had been a civilian, suit challenging the manner in which the government chose to design a military aircraft would be barred by the discretionary function exception to the Federal Tort Claims Act, 28 U.S.C. § 2680(a). See *United States v. S.A. Empresa de Viacao Aerea Rio Grandense (Varig Airlines)*, 467 U.S. 797 (1984).

Congress has excluded these types of cases from the FTCA's waiver of sovereign immunity not because of solicitude for the fullness of the federal treasury but because of substantial concerns relating to the separation of powers. As this Court recently noted, the discretionary function exception is intended "to prevent judicial 'second-guessing' of legislative and administrative decisions grounded in social, economic, and political policy through the medium of an action in tort." *Varig Airlines*, 467 U.S. at 814. Design decisions, particularly those regarding complex equipment, require countless trade-offs: for example, should systems be made redundant to enhance safety at the expense of increased weight or complexity? Should performance be compromised because of considerations of cost? Should there be additional testing to ferret out design flaws, or does the need for accelerated deployment mandate less extensive testing?

These kinds of discretionary determinations are "not one[s] which the courts, under the Act, are empowered to cite as 'negligence'" (*Dalehite v. United States*, 346 U.S. 15, 41 (1953)). Were a court to hold otherwise, it "would seriously handicap efficient government operations." *United States v. Muniz*, 374 U.S. 150, 163 (1963).

The policies of judicial restraint that underlie the discretionary function exception apply with special force in the area of national security and defense—subjects uniquely committed to the political branches of government. Decisions regarding the need for and design of military equipment are exclusively the province of Congress and the Executive.

It is difficult to conceive of an area of governmental activity in which the courts have less competence. The complex, subtle, and professional decisions as to the composition, training, equipping, and control of a military force are essentially professional military judgments, subject *always* to civilian control of the Legislative and Executive Branches.

Gilligan v. Morgan, 413 U.S. 1, 10 (1973) (emphasis in original). See also *Chappell v. Wallace*, 462 U.S. 296, 302 (1983).

The settled rule against judicial oversight of military decision-making rests on far more than the lack of judicial competence to assess military judgments. Equally important is the concern that tort litigation challenging military determinations would "involve the judiciary in sensitive military affairs at the expense of military discipline and effectiveness." *United States v. Shearer*, 473 U.S. 52, 59 (1985). This Court has repeatedly emphasized the "peculiar and special relationship of the soldier to his superiors, the effects of the maintenance of such suits on discipline, and the extreme results that might obtain if suits under the Tort Claims Act were allowed for negligent orders given or negligent acts committed in the course of military duty." *United States v. Brown*,

348 U.S. 110, 112 (1954). See also *Shearer*, 473 U.S. at 58.

Without question, petitioner's complaint, if brought against the Navy, would "strike[] at the core of these concerns." *Shearer*, 473 U.S. at 58. It would require the courts to second-guess discretionary military determinations in the design of the CH-53 helicopter. And it would undermine military discipline by permitting a "soldier * * * to hale his superiors into court" (*Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666, 676 (1977)) to explain why military equipment was designed as it was—i.e., why safety considerations were not given more weight. Plainly, the courts would not allow such a lawsuit to proceed.

Petitioner does not contest these points. Rather, he asserts that "[n]either the United States nor the Navy are on trial in this case" (Pet. Br. 40) and that "[t]he Courts do not need to question military decisions" (*id.* at 43). Nor does petitioner dispute that a defense contractor could not be held liable if it merely manufactured a weapons system pursuant to specifications designed entirely by the government. See *id.* at 40. There, too, the military's discretionary determinations would be challenged in court as a result of injuries suffered by a serviceman. According to petitioner, however, *this* suit is different, because the CH-53 helicopter was designed in large part by Sikorsky, a private contractor. "The Navy was simply one of Respondent's customers, a relatively sophisticated customer to be sure, but a customer nevertheless." Pet. Br. 41-42.

As explained below, petitioner's submission reflects a serious misunderstanding of modern defense acquisition practices. While the complexities of today's weapons systems normally require the Department of Defense to enlist the technical expertise of private industry, ultimate authority over the design of every weapons system, every aircraft, every piece of equipment always rests entirely with the military. It is the military, as it must be, that

determines whether and to what extent to stress performance over cost, or safety over efficiency; it is the military that dictates the scope and degree of testing; and it is the military that determines whether a weapons system is designed in a way that will meet its needs in time of war. Accordingly, if a defense contractor were exposed to tort liability for these design decisions, the policies underlying the government's own immunity would be defeated.

B. The Military Controls All Facets Of The Defense Procurement Process, Including The Design Of Major Weapons Systems

Respondent's brief details the arduous process under which the CH-53 helicopter was devised, designed, tested and produced. At every stage of this process respondent's designers, engineers and employees worked under the close supervision and control of the Navy. As a result, the helicopter that eventually was manufactured and placed into service was the helicopter that the Navy intended to procure.

The joint involvement of Sikorsky and the Navy in the development of the CH-53 is typical of modern defense procurement. Virtually every major weapons system undergoes multiple stages of design, each involving successive levels of government scrutiny and approvals. In light of the character of this team effort, it is foolish for petitioner to suggest that courts adjudicating tort suits could surgically separate the contributions of the government from those of the private contractor and limit their inquiry to faults of the latter. Allowance of such suits would inescapably jeopardize the public policies that shield discretionary military judgments from judicial review.

While the design process may vary somewhat in particular instances, the development of a major military weapons system or item of sophisticated military equipment typically follows a course like that we now describe.

1. *Concept formulation.* The initial stage of the defense acquisition process consists of the identification of

a discrete military mission—for example, an aircraft that has a range of 10,000 miles and can avoid detection by enemy radar. The Defense Department, either alone or in conjunction with one or more contractors, normally conducts feasibility studies through applied research, physical and mathematical modeling, and laboratory experiments, in an effort to arrive at a workable solution. See DoD Directive No. 5000.1, "Major System Acquisition," at 6 (Mar. 12, 1986); *Defense Research and Development* 11, 118 (R. Sanders ed. 1968); M. Peck & F. Scherer, *The Weapons Acquisition Process: An Economic Analysis* 461-464 (1962).

If a technical solution appears feasible, the Defense Department conducts an elaborate review, evaluated at the highest levels, to ensure that the "best technical approach[] [has] been selected" and a "thorough trade-off analysis has been made." Blue Ribbon Defense Panel, *Report to The President and the Secretary of Defense on the Department of Defense* 70 (1970); see OMB Circular A-109, *Major Systems Acquisitions*, 41 Fed. Reg. 14825, 14827 (1976). Once funding and final approvals are obtained, a solicitation is issued to prospective contractors to submit proposals for the engineering development contract. See 10 U.S.C. § 2304.

This solicitation, while conceived in general terms, incorporates thousands of engineering standards that govern many aspects of the proposals. The specifications reflect the military departments' institutional learning and embody numerous trade-offs among quality, cost, standardization, ease of maintenance, and other attributes. Even at this early stage, therefore, the specifications, by prescribing "how contractors [are] to accomplish specific tasks," effectively dictate many choices of design, including materials, parts, assembly, dimensions, weight, electrical and mechanical requirements, and safety features. See *Defense Department Authorization and Oversight Hearings on H.R. 1872 Before the House Comm. on Armed Services*, 99th Cong., 1st Sess. 1579-1580 (1985) (statement of William H. Taft IV, Deputy Secretary of

Defense) ("House Hearings"); J. Cibinic & R. Nash, *Formation of Government Contracts* 189-190 (1982). This is true even where those choices may appear to have been made solely by the contractor. See Finn & Martin, *Strict Liability in Military Aviation Cases—Should It Apply?*, 48 J. Air L. & Comm. 347, 350 (1983); R. Coulam, *Illusions of Choice* 345-347 (1977).

In initiating the process that led to the CH-53 helicopter, for example, the Navy utilized its basic helicopter specification, which applied to design of all Naval helicopters. SD-24H, Vol. II (DX-11, J.A. 514). This specification explicitly addressed measures for escape, requiring the installation of emergency exits for the pilot and copilot through readily jettisonable cockpit side windows designed to provide access to rescuers outside the aircraft as well as to avoid obstacles to escape. *Ibid.*; see also J.A. 518-519. These military requirements effectively compelled a design in which the escape hatch opened out.

2. *Selection of the engineering development contractor.* Companies competing for the engineering development contract prepare technical proposals, which generally describe the design and contain preliminary drawings. *Defense Research and Development* 119. "In this process [the contractor] carries on a continuous dialogue with the Services, frequently learning of technical limitations that cause him to revise his program." *Id.* at 117. During this process of consultation and review, the government can and frequently does insist on changes in the design. Reda, *Legal Impact Of Contract Management By Government*, 24 Bus. Law. 925, 928-929 (1969); Peck & Scherer 466.

After the contractors submit their final proposals, the proposals are "broken down into a large number of technical and management considerations," each of which "is then assigned for evaluation to a small number of [Defense Department] technical or management experts who in the aggregate comprise an evaluation team which may number several hundred." Blue Ribbon Defense Panel 71. Each team combs through the proposals and makes rank-

ings, which are then assigned pre-determined weights, summed up, and forwarded for review to a source selection authority. Based upon these scores and other variables, such as past performance and price, the authority selects a contractor and the engineering development contract is awarded. *Ibid.* In the course of final contract negotiations, the prior military specifications, augmented by any additional or modified designs proposed by the contractor and approved by the government, are incorporated by reference into the contract.

3. *Engineering development.*

a. *Detailed engineering.* Upon award of the contract, the project enters engineering development, in the course of which the details of the design are fixed and the system readied for production. *Defense Research and Development* 15. What began as a mission need and a concept formulation develops into a working model or prototype. During this stage, "the design process quickly [becomes] narrowly focused" by technical requirements imposed by the military. Coulam 117. At each successive level of detail, the resulting specifications undergo review by the military, which retains sole authority to accept the design, reject it, or modify it irrespective of the contractor's views. See 48 C.F.R. §§ 52.243-1, 52.243-4; J. Cibinic & R. Nash, *Administration of Government Contracts* 267, 269-270, 277 (2d ed. 1985); Reda 928-929.

The government's design oversight is achieved by scores of military scientists and engineers in every technical discipline, including safety experts, who evaluate the unfolding designs under the auspices of a program management office. This office is specially constituted by the Defense Department for the project at hand; for major projects, it includes a field office at the contractor's plant. See Peck & Scherer 82; Barnes, *Contract administration in DoD*, *Defense Management Journal*, Fourth Quarter 1984, at 33-36. The office for the F-111 fighter-bomber, for example, consisted of some 120 full-time government engineers, augmented by additional Air Force engineers as needed,

with specialties that included airframes, propulsion, guidance, control, flight testing, production engineering and field support. See Coulam 351. These government employees work hand-in-hand with their counterparts in the contractor's engineering department. Peck & Scherer 82; Coulam 118; Anderson, *Preparing for production of a major weapons system*, Defense Management Journal, Sept.-Oct. 1979, at 21-22.

Military program managers are charged with dozens of mandatory responsibilities, including assurance of overall integrity in the design of the weapons system and approval of the necessary trade-offs in design due to considerations of cost and schedule. See 48 C.F.R. §§ 42.302 (38)-(47), 242.302; Peck & Scherer 466. As for the contractor, it is obliged to furnish the government with monthly or even weekly progress reports on the development of the design, replete with engineering drawings. See Defense Systems Management College, *Department of Defense Manufacturing Management Handbook for Program Managers* 3-19, 7-34 to 7-35 (2d ed. 1984). Safety concerns are an integral part of this process. The contractor is required to perform regular system safety assessments and to provide periodic reports to the military. See MIL-STD-882B (Mar. 30, 1984); DoD Instruction No. 5000.36 (Apr. 14, 1986) (DoD safety standard specifications).

The government also conducts formal design reviews at which designs are critiqued and changes mandated or approved. See *Defense Research and Development* 136. Any change, of course, sends repercussions throughout the entire system, often necessitating further revisions. See Reda 929-930; Peck & Scherer 43. These design reviews typically consume several months and thousands of man-hours.

b. *Testing and evaluation.* With the completion of the engineered design, the project enters a phase of government-supervised testing and evaluation. For aircraft, government specifications prescribe an extensive

regimen that calls for wind-tunnel tests, aircraft mock-ups, prototype analyses, and flight tests. See 48 C.F.R. §§ 246.101-246.170; DoD Directive No. 5000.3, "Test and Evaluation" (Mar. 12, 1986); Defense Systems Management College, *Systems Engineering Management Guide* 7-4 to 7-5, 13-1 to 13-25 (Oct. 1986).

The mock-up phase enables the government's technical personnel to inspect a full-scale model of the aircraft with actual equipment in place, accompanied by supporting data on structural analysis, carrier suitability, standardization, weight and balance. Teams of government specialists, including pilots, engineers, and human factors experts, pore over every inch of the mock-up to ensure that all aspects of the configuration are appropriate for the aircraft's mission. In the case of the CH-53, the detailed specification governing the Navy's inspection called for examination of any characteristics of the cockpit "that may endanger the crew," including escape routes, clearances, and escape hatches and their jettisoning. DX-16, J.A. 559.

With production of the prototype, the aircraft undergoes an even more extensive series of tests to ensure compliance with the specifications. The prototype of the CH-53, for example, was subject to analysis by scores of Navy engineers at the Sikorsky plant as well as at Naval flight facilities in Maryland. J.A. 308. The contractor must incorporate any changes ordered by the government following detailed inspection of the prototype. Thereafter, the prototype undergoes a number of flight tests pursuant to test plans approved by the military. The great majority of the flight tests are conducted by military pilots, at military facilities, with little or no involvement by the contractor.

As design issues surface during the testing process, the government may call upon the contractor to devise improvements. Any proposed changes in the design specifications are then carefully reviewed by the military. Once the government is satisfied that it has what it wants, the detailed specifications for the system are ap-

proved and incorporated by reference into the production contract, where they provide the manufacturing blueprint.

4. *Government configuration control.* Beginning no later than the production phase, any effort by the contractor to alter the design, as reflected in drawings and specifications, is severely limited by the process of configuration control. Under this process, the contractor must obtain the government's advance approval before it may make *any* change in the existing configuration.

The approval process requires submission of a written engineering change proposal, or "ECP." The ECP must detail, among other things, "cost and schedule impact, effect on operation and logistics of the equipment, retrofit requirements and interfaces with other systems." Cibinic & Nash, *Administration of Government Contracts* 284; see, e.g., DOD-STD-480A (Apr. 12, 1978) and DOD Engineering Change Proposal Form 1692 (calling for an assessment of trade-offs, alternative solutions, and effects on "performance" and "operational effectiveness"). These same procedures also must be used to modify the design of military equipment after it has been placed in service.

It is not uncommon for a major weapons system project to generate several thousand ECPs a year. Each is subjected to thorough military scrutiny. See Peck & Scherer 466-467:

[E]ach proposed change must be authorized by buying agency plant representatives (if it is minor in nature), by the service program management office or by a specially constituted engineering change review committee (for changes costing more than a few thousand dollars), or even by the service headquarters (if the weapon's military mission characteristics are affected).

The government at all times is the final arbiter of proposed modifications. If the military elects to institute a change, for whatever reason, the contractor must accept the change and proceed with the work pursuant to the

unilateral changes clause of the contract. See, e.g., 48 C.F.R. § 52.243-1.

C. Suits Against Defense Contractors Alleging Design Defects Threaten The Same Interests That Compel Governmental Immunity

This brief description of the realities of the military procurement process demonstrates the fallacy in petitioner's crucial assertion (Br. 42) that the Navy was nothing more than a "customer" for respondent's helicopters. The military does not buy bombers, tanks or rockets "off the showroom floor." To the contrary, commensurate with its enormous financial and strategic investment in a major weapons system and the inherently governmental character of many of the decisions that must be made, the military assumes responsibility for and exerts complete control over *all* aspects of design and production.

Thus, although many design concepts and innovations are initially contributed by the contractor, the evolving design passes through layers of government review and approval, each refinement of the specifications in turn controlling the next level of detail. Throughout, the government maintains absolute discretion to dictate schedules, to determine the extent of testing, to jettison a design, or to order alterations unilaterally. And once a weapons system enters configuration control, the contractor may not make *any* design changes except through formal channels requiring thorough analysis and explicit approval by the government. In sum, "[t]here can be no question that the design of military equipment is, at bottom, a military decision." *Bynum v. FMC Corp.*, 770 F.2d 556, 569 (5th Cir. 1985).

Because the design of military equipment ultimately reflects discretionary military judgments, "it is nearly impossible to contend that the contractor defectively designed a piece of equipment without actively criticizing a military decision." *Tozer v. LTV Corp.*, 792 F.2d 403, 406 (4th Cir. 1986), petition for cert. pending, No. 86-674. As a result, suits against defense contractors al-

leging injuries due to defective design of military equipment, brought by either civilian or military plaintiffs, "would have the same effect * * * as a direct inquiry into military judgments" (*United States v. Johnson*, No. 85-2039 (May 18, 1987), slip op. 9 n.11) and would raise precisely the same concerns that have led Congress and this Court to prohibit such suits against the government.

To begin with, courts trying these product liability cases inevitably would be obliged to second-guess determinations regarding military needs.

Such judgments involve the nation's geopolitical goals and choices among particular tactics, the need for particular technologies resulting therefrom, and the likely tactics, intentions, and risk-averseness of potential enemies.

In re "Agent Orange" Product Liability Litigation, No. 85-6163 (2d Cir. Apr. 21, 1987), slip op. 7. Thus, "to hold military suppliers liable for defective designs where the United States set or approved the design specifications would thrust the judiciary into the making of military decisions." *McKay v. Rockwell Intern. Corp.*, 704 F.2d 444, 449 (9th Cir. 1983), cert. denied, 464 U.S. 1043 (1984). See also *Koutsoubos v. Boeing Vertol*, 755 F.2d 352, 354 (3d Cir. 1985), cert. denied, 106 S.Ct. 72 (1985); Turner & Sutin, *The Government Contractor Defense: When Are Manufacturers Of Military Equipment Shielded From Liability For Design Defects?*, 52 J. Air L. & Com. 397, 444 (1986).

Separation of powers considerations aside, civilian judges and juries simply lack the competence to "weigh the cost of injuries caused by a product against * * * lost military efficiency." *Agent Orange*, slip op. 7. Military aircraft safety conceivably could be enhanced, for example, by inclusion of multiple backup systems utilized in civilian aircraft, but the added weight required to accommodate such redundant equipment might reduce the plane's maximum speed or payload and make it unlikely

to fulfill its military mission.¹ Such trade-offs between safety, on the one hand, and combat effectiveness, cost, and efficiency, on the other, therefore must be made by the military, not by individual judges and jurors adjudicating tort suits.

Compounding the peril of lay intrusion in military decision-making is the "danger in transporting the rubric of tort law and products liability to a military setting and military technology." *Tozer*, 792 F.2d at 406. Development of weapons systems requires the government and its contractors "to push technology towards its limits and thereby to incur risks beyond those that would be acceptable for ordinary consumer goods." *McKay*, 704 F.2d at 450. See *Agent Orange*, slip op. 7. Risks that would be unreasonable in the ordinary consumer context "might be acceptable—or indeed necessary—in light of the military mission of the aircraft." *Tozer*, 792 F.2d at 406. Yet "it is the needs of national defense, not accident costs, that must be the ultimate standard by which the purchase of military equipment is measured." *Bynum*, 770 F.2d at 575. It is not difficult to "[i]magine the chaos that would occur in the Armed Forces * * * if the

¹ The design decisions encountered in the development of the B-47 aircraft lend a perfect illustration. In a report to command, the Air Force engineers working on development of the B-47 expressed concern that the demands for increased safety and other features would compromise the aircraft's mission:

We will soon have hundreds of efficient flying machines that can take off on short runways at heavy weight, dispense chaff, employ ECM, navigate with several different types of electronic and radio equipment, withstand enemy fire, communicate thousands of miles by radio, cope with almost any emergency by use of duplicate systems, and boast every other feature developed by modern science for crew efficiency and convenience. There is one thing wrong with these B-47's—they can't fly far enough to reach the target.

Operational Engineering Section, MacDill Air Force Base, *Specific Item Report #52* (June 1952).

judiciary could cause the recall or withdrawal of military equipment and products." *Turner & Sutin* 447.²

These policy concerns are heightened where, as here, the injured party is a serviceman. Because of the government's extensive role in the design process, trials on design defects inevitably would "involve second-guessing military orders, and would often require members of the Armed Services to testify in court as to each other's decisions and actions." *Stencel Aero*, 431 U.S. at 673. Soldiers pointing a finger at defense contractors, contending that the design of military equipment was unsafe, would in reality be accusing their superior officers, who approved the design and authorized production of the equipment pursuant to the design.

Finally, allowing defense contractors to be sued for design defects would substantially and adversely alter the defense procurement process. Equipment designs currently are the result of continuous and mutually beneficial interchange, whereby the "contractor and the military pool their expertise, matching the latest advances in military technology with the specific dictates of the

² By the same token, the government procurement process bears no resemblance to other purchases. Ordinary consumers do not have the right to mandate every aspect of design; do not install engineers at the manufacturer's plant to critique every engineering drawing; cannot insist on changes over the manufacturer's objections; and do not thoroughly control the manufacturer by statute and regulation. Unlike the ordinary consumer, the government "may be as knowledgeable about the design, test results and capabilities of the product as is its manufacturer." *Finn & Martin* 350. And given the government's final decision-making authority and monopsony power, a "supplier is frequently unable to negotiate with the United States to eliminate [safety] risks." *McKay*, 704 F.2d at 450. Accord, *Bynum*, 770 F.2d at 566; *Tillett v. J.I. Case Co.*, 756 F.2d 591, 597 (7th Cir. 1985). In these circumstances, incentives aimed at defense contractors "do not serve the public policy purpose of strict tort liability of encouraging 'individually safe' product design at the possible expense of performance." Sullivan, Prout & Randell, *The Military Aircraft Manufacturer—Caught Between Country and the Courts*, *Aviation Law: Current Issues, Statutes and Defense Practice* 44, 50 (1979).

mission." *Tozer*, 792 F.2d at 407. See also *McKay*, 704 F.2d at 450. Yet if contractors—and contractors alone—could incur tort liability to third parties for their role in the design of military equipment that met military specifications, "there would be a decrease in contractor participation in design, an increase in the cost of military weaponry and equipment, and diminished efforts in contractor research and development." *Tozer*, 792 F.2d at 407. See page 27, *infra*. See also *Agent Orange*, slip op. 8-9 (discussing the severe harms to the procurement process and the unfairness of exposing military contractors to liability for design defects).

D. The Test Articulated By The Majority Of Courts Of Appeals Properly Defines The Elements Of The Government Contractor Defense

In light of these significant policy concerns, every court of appeals to consider the question has ruled that some form of government contractor defense is necessary to prevent judicial second-guessing of decisions made by military authorities about the design of military equipment and weapons systems. See *Agent Orange* (2d Cir.); *Koutsoubos* (3d Cir.); *Tozer* (4th Cir.); *Bynum* (5th Cir.); *Tillett* (7th Cir.); *McKay* (9th Cir.); *Shaw* (11th Cir.).³ Moreover, except for the Eleventh Circuit, the lower courts are in substantial agreement as to the appropriate contours of the defense. We submit that the majority view properly delineates the defense, confining its application to those instances in which it is needed to

³ Numerous commentators have also urged the defense. See, e.g., Note, *In Defense of the Government Contractor Defense*, 36 Cath. U.L. Rev. 219 (1986); Comment, *The Government Contract Defense*, 27 How. L.J. 275 (1984); Note, *McKay v. Rockwell International Corp.: No Compulsion Required for Government Contractor Defense*, 28 St. Louis U. L.J. 1061 (1984); Polinsky, *Product Liability and the United States Government Contractor*, 14 Pub. Cont. L.J. 313 (1984); Sullivan, Prout & Randell, *supra*; Finn & Martin, *supra*; Tobak, *A Case of Mistaken Liability: The Government Contractor's Liability for Injuries Incurred by Members of the Armed Forces*, 13 Pub. Cont. L.J. 74 (1982); Turner & Sutin, *supra*.

advance the substantial public interests served by the government's own immunity; the restrictive version of the defense recognized by the Eleventh Circuit in *Shaw*, by contrast, is based on fallacious premises and is entirely inadequate to protect those interests.

The modern government contractor defense has evolved from two antecedents—the doctrine that an agent cannot be held liable for actions undertaken on behalf of the government and in conformity with its directions (see, e.g., *Yearsley v. W.A. Ross Constr. Co.*, 309 U.S. 18 (1940)), and the related principle that a manufacturer who produces an allegedly defective product in conformity with contract specifications is not ordinarily liable for design defects in the product (see, e.g., Restatement (Second) of Torts § 404, comment a (1965)). But changes over the last 30 years in both the defense procurement process and product liability law have rendered these traditional doctrines inadequate to respond to the problems posed by cases such as the present one. See *Bynum*, 770 F.2d at 563-564. As recounted above, the manufacturer of allegedly defective military equipment usually has had a hand in its design, and plaintiffs accordingly have sought to circumvent restrictions such as the contract specifications defense by attacking the contractor for its design role. The courts have thus been called upon to consider whether and to what extent such suits should be allowed to proceed.

The leading formulations of the government contractor defense are those propounded by the Ninth Circuit in *McKay* and the district court in *In re "Agent Orange" Product Liability Litigation*, 534 F. Supp. 1046, 1055 (E.D.N.Y. 1982). Both versions require consideration of three factors: (1) the extent of the government's role in formulating the specifications for the allegedly defective product; (2) the contractor's compliance with the specifications; and (3) the contractor's giving of appropriate warnings where necessary.⁴ These criteria, as explicated

⁴ The *McKay* test also includes the additional element that the United States itself be immune. 704 F.2d at 451. This element

by the courts that follow the *McKay* test, ensure that the defense is available in those situations—and only those situations—in which judicial review of military design decisions would frustrate the policies that undergird the government's immunity.

1. *The government's role in establishing or approving the design.* The first inquiry in delineating the government contractor defense is how much government involvement in the design process is necessary to justify recognition of contractor immunity. The *McKay* test looks to whether the design of the military equipment may fairly be said to embody *governmental* judgments. Thus, the government participation element is satisfied not only where "the government established the design and specific characteristics" (*Agent Orange*, 534 F. Supp. at 1056), but also where "the United States reviewed and approved a detailed set of specifications" (*McKay*, 704 F.2d at 450), "where the government established or approved the specifications" (*Koutsoubos*, 755 F.2d at 355 (emphasis in original)), or where there is "government approval of specifications developed through a continuous series of negotiations between the contractors and the

doubtless reflects the fact that the policies relevant to the issue of contractor immunity are those that justify government immunity from similar suits. Because *McKay* and the other cases that have adopted its formulation all involved suits for injuries to servicemen, in which the government's immunity under *Feres* was unquestioned, there was no need for the courts to reflect on this part of the test.

In fact, however, the government-immunity element is both unnecessary and potentially confusing. It is unnecessary because any claim of defective design of military equipment, if leveled against the government, would necessarily implicate its discretionary function immunity. See *Dalehite*, 346 U.S. at 41; *Colorado Flying Academy, Inc. v. United States*, 724 F.2d 871, 880 (10th Cir. 1984), cert. denied, 106 S.Ct. 2915 (1986); *Daniel v. United States*, 426 F.2d 281, 282 (5th Cir. 1970). It is potentially confusing because a case may involve allegations of government negligence apart from product design, such as improper maintenance; whether the contractor is immune from suit for design flaws should not depend on whether the government is immune for such non-design-related conduct.

military * * * [i.e.,] so long as there is true government participation in the design" (*In re Air Crash Disaster at Mannheim Germany*, 769 F.2d 115, 122 (3d Cir. 1985), cert. denied, 106 S.Ct. 851 (1986)).

Indeed, the defense is available "even though the majority of specifications originated with the contractor" (*Air Crash Disaster*, 769 F.2d at 122). "The contractor's participation in design—or even its origination of specifications—does not constitute a waiver of the government contractor defense" (*Tozer*, 792 F.2d at 407). The key question is the extent to which the government has retained control over design selection. Where such control exists, judges and juries would have to review military decisions in passing upon the allegation that there were deficiencies in the design.

The considered judgment and approval by government authorities that is necessary to satisfy this element of the defense may be demonstrated by a wide variety of activities. For example, government control is established where the engineering development contract incorporates the challenged specifications and prohibits deviation from them by the contractor. *Air Crash Disaster*, 769 F.2d at 124. Alternatively, the contractor may document back-and-forth discussions over design specifications, culminating in sign-off by the government. *Ibid.*; *Tozer*, 792 F.2d at 407; *Koutsoubos*, 755 F.2d at 354-355. Government inspections or tests of mockups or prototypes will also suffice. Pet. App. A6; *Air Crash Disaster*, 769 F.2d at 123. And even if the government did not initially participate in the challenged design, it may ratify the design decision by continuing to use the product despite awareness of the alleged defect. *Dowd v. Textron, Inc.*, 792 F.2d 409, 412 (4th Cir. 1986), petition for cert. pending, No. 86-379.

These rulings manifest judicial recognition of the realities of the military contracting process. The interactive partnership between government and contractor that characterizes the development of sophisticated mili-

tary systems and equipment is in the end dominated by the government. It is the military's continual and non-delegable responsibility to make the decisions involving trade-offs between combat effectiveness, cost, speed of production, safety of use, ease of maintenance, and other factors relating to the capacity of the item in question to best serve the requirements of national defense. When dealing with equipment designed to be used by our Nation's soldiers in wartime, it could hardly be otherwise.

Against this background, any judicial effort to identify the originator of a particular design feature or concept would be seriously misdirected. For wherever the idea originated, its ultimate incorporation into the design specifications for the system or equipment at issue reflects a decision by military authorities to employ that design rather than to use known alternatives or continue a possibly costly and time-consuming quest for better options. Because that is so, judges and juries would inevitably be required to probe *military* judgments if they were permitted to pass on whether a design feature—even one first proposed by the contractor—was defective, or was instead acceptably safe in light of the military purposes underlying procurement of the equipment.

2. *Conformity with government specifications.* The second element of the test is straightforward and uncontroversial. If the plaintiff's injury was caused by a departure from the manufacturing specifications, rather than a design problem, there is no reason to confer immunity, because the suit will not call into question any policy decision of the government. In fact, quite the opposite is true: because the design embodies the government's expert determination about how military equipment should be constructed, a failure to conform to manufacturing requirements disserves the public interest and warrants no judicial protection.

3. *Warnings.* The government contractor defense is predicated on the assumption that the design of military equipment reflects specialized military judgments. Be-

cause of the degree of government involvement in and control over the design process, the design elements incorporated in the final production specifications are presumed, whatever their original source, to embody military determinations that are not amenable to judicial review under principles of tort law. But if the contractor has withheld knowledge of design flaws that it possesses and the government does not, the assumption underlying the defense may not be valid.

Accordingly, the *McKay* formulation denies immunity for failure to warn of certain dangers. This restriction is a limited one: the contractor must have had actual knowledge of a latent dangerous condition not known to the government;⁵ moreover, where a warning is given, there need be no government response explicitly accepting the risk. See, e.g., *Tozer*, 792 F.2d at 408; *Bynum*, 770 F.2d at 574; *Air Crash Disaster*, 769 F.2d at 124-125; *Tillett*, 756 F.2d at 599; *McKay*, 704 F.2d at 451.⁶

⁵ The courts have refused to impose liability based on a contractor's failure to warn of dangers also known to the government. In *Air Crash Disaster*, for example, the plaintiffs argued that the contractor should have told the government of an internal report that analyzed the transmission failure leading to a helicopter crash. The Third Circuit rejected this contention as "irrelevant" (769 F.2d at 124) because uncontested evidence at trial established that the Army had independent knowledge of the faulty transmission based on its experience with earlier crashes but had refused to institute the corrective measures proposed by the contractor. Similarly, in *Tillett*, the Seventh Circuit held that the contractor was under no duty to issue an independent warning of the danger of omitting a roll-bar from a front-end loader, because military authorities were already aware of the danger. 756 F.2d at 599.

⁶ *McKay* speaks of "patent" errors (704 F.2d at 451), but it is plain from the entire context that the term was meant to limit the warning requirement to dangers of which the contractor had actual knowledge. See *Bynum*, 770 F.2d at 575-576 n.28. It would be nonsensical, and would hardly advance the purpose of ensuring parity of knowledge between contractor and government, to require the contractor to warn of defects that are patent in the sense of being obvious to all.

In sum, the standard devised in *Agent Orange* and *McKay*, which has garnered virtually unanimous acceptance, accomplishes exactly what the government contractor defense sets out to accomplish and nothing more. The test limits judicial review when responsibility for the design decision under fire is fairly attributable to the government. On the other hand, the contractor receives no protection for defects attributable to its own faulty manufacture. Furthermore, the defense is available only when the government, in deciding upon the design, was aware of potential safety problems known to the contractor. Thus, the standard ensures that the policies advanced by sovereign immunity are not subverted by lawsuits such as the case at bar, while avoiding unnecessary immunity where vital government interests are not jeopardized by the litigation. Amici urge its adoption by the Court.

E. Adoption Of The *Shaw* Test Would Subvert The Public Policies That Government Contractor Immunity Is Designed To Serve

Like the other courts of appeals, the Eleventh Circuit has recognized that a due regard for the constitutional separation of powers compels adoption of a government contractor defense. *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736, 740-741 (11th Cir. 1985), petition for cert. pending, No. 85-1529. But the Eleventh Circuit has created a version of the defense that offers little protection to the military procurement process. *Shaw* recognizes government contractor immunity in only two circumstances: (1) where the contractor shows that it did not participate or participated only minimally in the design of the allegedly defective product or part; or (2) where the contractor warned the government of any risk of which it was or should have been aware, and the government nevertheless "clearly authorized" the contractor to proceed with the dangerous design. *Id.* at 746.

This test is constructed on a foundation of misconceptions about the military procurement process, fails to

appreciate the crucial differences between military and civilian priorities, and overestimates the ability of courts and juries to apply it without invading the realm of military decision-making. Moreover, both elements of the test threaten detrimental distortion of defense procurement.

1. *The Shaw test proceeds on plainly mistaken premises*

Although the Eleventh Circuit in *Shaw* acknowledged that government contractor immunity is required where it would serve to prevent judicial intrusion into military decision-making (778 F.2d at 743), the court failed to recognize that its analysis was built upon assumptions that are entirely incompatible with that premise. Those assumptions are (a) that the imposition of tort liability based on the contractor's contribution to the design will not invade the military's domain; (b) that the harms associated with the trial process itself are no more likely under the *Shaw* approach than under the *McKay* test; and (c) that the military mission will be aided by the impetus to "safer" design created by the risk of tort liability for the contractor.

a. We have explained above that the design of military equipment typically involves an interactive partnership between the government and the contractor. Even when the contractor initiates or helps formulate design ideas, its actions respond to a myriad of cues and directives from the government that reflect the judgments of military authorities. Most important, ultimate control over design rests at all times with the government. Because of this, the Eleventh Circuit is deluding itself if it believes that courts can avoid intruding on military decision-making by teasing apart the contractor's role in the design process from that of the government.

b. A second drawback of the *Shaw* test is the detrimental effect of the trial process on the interests served by government immunity. This is illustrated by *Shaw* itself, which grew out of an accident apparently caused by a design problem of which the Navy and Grumman

were both aware, but which they allegedly took inadequate steps to cure. Although the Navy had specifically reviewed and approved the modifications proposed by Grumman, the contractor was denied immunity on the ground that this approval was not "the sort of informed military decision * * * to which this Court must defer under separation of powers doctrine" (778 F.2d at 747).

How are courts and juries to determine whether a decision made by military authorities was "informed" or "military"? Today's technologically sophisticated military equipment embodies an aggregation of thousands of design decisions, any one of which could potentially become the hindsight focus of litigation following an accident. It would rarely be possible to reconstruct the extent to which military authorities overseeing the design were sufficiently "informed" to appreciate its risks,⁷ and witnesses would often disagree as to whether the approval of a particular design feature was actually driven by "military" considerations. Both the plaintiff and the contractor would rely on testimony of the military personnel involved in the design process, as well as other military "experts." Needless to say, this spectacle would inevitably involve the courts in the very kind of review of military actions that the Eleventh Circuit purported to eschew.

c. *Shaw* also relies heavily on misguided notions about the utility of the tort litigation system to promote the "safety" of military equipment. Thus, one reason given in *Shaw* for disregarding the risk of pass-throughs to the government of product liability costs is that in the end the government might save money if there were no immunity, for then the "legal incentives" of tort actions might "promote better-designed planes and fewer costly accidents" (778 F.2d at 742). In the Eleventh Circuit's view, when military equipment fails, "the design *a priori*

⁷ Indeed, this aspect of *Shaw* affirmatively encourages servicemen to challenge the competence of their superiors' decisions, thereby undermining a major basis of the *Feres* doctrine.

is unlikely to meet the military's general, qualitative specifications: that is, it has not in fact accomplished its mission, or performed properly, simply, or safely" (*id.* at 745). See also *McKay*, 704 F.2d at 461 (Alarcon, J., dissenting; emphasis added) ("It is the Military's, Rockwell's and this court's duty to insure that our servicemen are provided with reliable and safe equipment").

These assumptions may be perfectly appropriate in the case of civilian products, but their invocation here simply highlights why safeguards are required to prevent the courts from trenching on military decision-making. There can be little doubt that protection of military personnel and equipment through reduction of the number and severity of accidents is an important objective of both the Defense Department and the manufacturers of military equipment. See DoD Instruction No. 5000.36 at 1; Peck & Scherer 433, 476, 485. But the interests of national defense demand a weighing of many other considerations and proceed on assumptions wholly unlike those that predominate in civilian tort law.

The key point that the *Shaw* court failed to grasp is that the very concept of "safety" takes on entirely different coloration in the military context. Military equipment, by its nature, is meant for use in wartime, under conditions of extreme peril and uncertainty, with inevitable bloodshed. Due to such exigencies, military safety necessarily is defined not in terms of a particular victim of a particular accident but rather in total lives saved. That, in turn, is measured by the equipment's ability to accomplish its mission. "If a product is faster and therefore able to complete a mission more rapidly or to evade enemy attacks better, then the product may be 'safer' than an alternatively-designed product that may be more reliable in terms of component failure rate but is slower to complete a mission or less able to evade enemy attack." Sullivan, Prout & Randell 50; see also *Kropp v. Douglas Aircraft Co.*, 329 F. Supp. 447, 456 (E.D.N.Y. 1971). Moreover, the lives at stake (not to mention other values for which armed conflict may be necessary) are not sim-

ply those of the users of a particular item of military equipment, but include other troops dependent on the success of the mission, and ultimately civilian populations as well. The courts are ill-equipped to decide how to maximize "safety" in these circumstances.

2. *The Shaw test penalizes contractor participation in development of military technology*

Under the first element of the *Shaw* test, contractor immunity depends upon a showing that the contractor played little or no role in the allegedly defective design. But the contractor's creative contributions to the process of developing advanced military technology are vital to the success of the joint endeavor, and any rule that penalizes and thereby discourages such contributions should be rejected. Indeed, the *Shaw* test not only jeopardizes the existing process, it creates disincentives to recommended reforms of the military procurement system and runs counter to Defense Department management trends over the past two decades.

Commentators within and outside the Defense Department have agreed for years that the present degree of government overspecification, far from insuring safety, inhibits innovation, hampers flexible responses to novel problems, and unnecessarily increases costs. See, e.g., Coulam 347-349; Gansler, *A New Dimension in the Acquisition Process*, Defense Systems Management Review, Aug. 1977, at 6-12; House Hearings, 1579-1580; C. Hitch & R. McKean, *The Economics of Defense in the Nuclear Age* 248-253, 259 (1960). "The military Services have all too frequently tried to command the research and development community to invent new weapons to specification, just as they would command a platoon of infantry to march by the right flank." *Id.* at 248. Indeed, in 1970 the Blue Ribbon Defense Panel called upon industry to take greater initiative in technical decisions, despite the fact that the procurement "environment is largely controlled by the government." Blue Ribbon Defense Panel 85-86. In an effort to stimulate creativity and eliminate costly design changes during production, the Office of

Management and Budget has directed federal agencies to "[e]xpress needs and program objectives in mission terms and not equipment terms." OMB Circular A-109, 41 Fed. Reg. at 14826. By exposing the contractor to liability for playing an active part in the design process, the *Shaw* test would undermine these reform efforts and would stifle the government's ability to experiment with management styles that are best suited to an effective national defense.

3. *The Shaw test adopts an unworkable warning requirement*

Because the contractor almost invariably is involved with the government in designing military equipment, the first prong of the *Shaw* test will rarely be met. Immunity will therefore depend on satisfaction of the alternative prong, which requires timely and specific warnings of design risk. Nothing so well reflects the *Shaw* court's insensitivity to the character and needs of defense procurement, however, as the warning requirement it has fashioned.

a. The other courts of appeals have uniformly agreed that the duty to warn is confined to dangers of which the contractor has actual knowledge. See page 22, *supra*. By contrast, the Eleventh Circuit denies immunity if there has been a failure to warn of risks that "reasonably ought to be known given good design practice in the industry" (778 F.2d at 746). Moreover, this duty is to be measured against customary design practices in civilian as well as military spheres (*id.* at 746 n.17). As a result, defense contractors can be held liable under *Shaw* for latent defects that would have emerged with additional testing but did not surface because of military pressures to move expeditiously from testing to production or to limit development costs. As the Fifth Circuit pointed out in *Bynum*, a "should have known" criterion, coupled with reference to civilian standards of care, would result in precisely the type of judicial meddling in government policy-making that the Constitution forbids (770 F.2d at 576):

Such a duty would compel the military contractor to reevaluate the design specifications furnished by the government and to engage in testing not required under the government contract. Such reevaluations and additional testing would mean delay and an increase in defense costs not contemplated by the military authorities. * * * When to require additional testing of military equipment, and at what cost, are decisions that are better left to the military and the political branches of government.

b. *Shaw* parts company with the majority rule in yet another harmful respect: it appears to impose a duty to warn and to offer remedies even where the government is itself aware of the existence of a potentially unsafe design feature. And even though the contractor may have given an adequate warning, it still must prove that the military "clearly authorized the contractor to proceed with the dangerous design" (778 F.2d at 746). These requirements provide powerful incentives to create a meaningless paper trail of warnings and "clear" approvals on any element that is perceived to involve a risk of potential liability. As this Court cautioned in an analogous context, a contractor's "fear of exposing itself to substantial liability may cause it simply to bury the [government] in an avalanche of trivial information—a result that is hardly conducive to informed decision-making." *TSC Industries, Inc. v. Northway, Inc.*, 426 U.S. 438, 448-449 (1976).

The upshot of such an approach would be neither improved safety nor satisfaction of the other demands of the military procurement system. Engineers employed by private contractors, squandering valuable time better spent in the laboratory, would be motivated to draft catalogues of possible design defects and to propose remedies (*e.g.*, back-up systems) that, in many instances, they may be quite certain the government would reject. These "warnings" would mount on government desks, often distracting attention from safety questions that are more deserving of attention; the government in turn would be under pressure to employ personnel to read the reports and to respond, point-by-point, with explicit approvals

that are "obviously related and responsive to the relevant warning" (778 F.2d at 746). Even at that, the government's approval apparently would not receive credence under *Shaw* unless it is demonstrated to a judge or jury that the government had expertise to make a "judgment to go ahead with a dangerous design" (*ibid.*).

This sort of reordering of military priorities thrusts the judiciary deep into areas that should be the exclusive province of the legislative and executive branches. It certainly is not the courts' responsibility to create a Military Product Safety Commission within the departments and agencies responsible for defense procurement. Nor is it appropriate for the courts to scrutinize the government's expertise in assessing safety considerations. As the Ninth Circuit recognized in *McKay*, "the government, the sole purchaser of most military equipment, has both the ability to recognize safety problems in military equipment and to negotiate with suppliers to remedy those problems." 704 F.2d at 452.

By conditioning contractor immunity on labyrinthine government approvals and a level of testing satisfactory to judges and juries, the *Shaw* approach turns the defense into a minefield that discourages the contractor from reporting defects in the first place. See *Turner & Sutin* 441. Without the assurance of immunity, any warning could be construed as an admission that the equipment is defective, especially if the government were to ignore the advice or could later be held not to have appreciated it. This result works directly counter to the mutual consultation and cooperation that is crucial not only for development of superior military systems but for safety itself. *Bynum*, 770 F.2d at 556; *Tillett*, 756 F.2d at 597; *McKay*, 704 F.2d at 450.

CONCLUSION

The judgment of the court of appeals should be affirmed.
Respectfully submitted.

KENNETH S. GELLER

Counsel of Record

ANDREW L. FREY

PATRICIA A. MCCOY

Mayer, Brown & Platt

2000 Pennsylvania Ave., N.W.

Washington, D.C. 20006

(202) 463-2000

Attorneys for Amici Curiae

MAY 1987

APPENDIX

Amici curiae consist of the following associations and companies that are engaged in the manufacture of military weapons systems and equipment.

A. Associations

1. *National Security Industrial Association* is a national organization of some 400 manufacturing, research and service companies from all segments of industry interested in and related to our national security. Most of the largest American manufacturing companies on DoD's list of "Top 100 Prime Contractors for 1986" are NSIA members. Also, some 275 NSIA members are small to medium companies providing needed goods and services to the government as prime contractors and subcontractors. The Association's province is the business and technical aspects of the government-industry relationship encompassing government policy and practice in the entire procurement process, research, development, logistics support, and many other areas.

2. *Aerospace Industries Association of America*, with approximately 50 members, represents the nation's major manufacturers of commercial, military and business aircraft, missiles, spacecraft, and related components and equipment.

3. *American Gear Manufacturers Association* is a trade association organized to address critical issues confronting the gear industry in this country, including product liability, defense procurement, and international trade. AGMA's membership consists of over 300 gear manufacturers, including numerous companies that supply gears and other components for military weapons systems.

4. *Electronic Industries Association*, representing over 500 companies, is a national trade organization established to advance the interests of the domestic electronics industry. Its members include companies that develop or

manufacture specialized electronics systems for government use. EIA is particularly concerned about issues arising out of the defense procurement process, including specifications, engineering management, material management and procurement, and manufacturing methods.

5. *General Aviation Manufacturers Association* was established in 1970 to foster improved safety in the aviation industry. Its members include approximately 40 manufacturers of small airplanes, aircraft accessories and components.

6. *National Association of Manufacturers of the United States of America* is a non-profit voluntary business association representing approximately 13,000 companies throughout the United States. A considerable portion of the association's membership consists of government contractors that are vitally affected by the government contractor defense in product liability suits.

B. *Individual Companies*

1. The Boeing Company
2. Eaton Corporation
3. Emerson Electric Company
4. FMC Corporation
5. Goodyear Tire & Rubber Company
6. Hughes Aircraft Company
7. IBM Corporation
8. ITT Defense Technology Corporation
9. Litton Industries, Inc.
10. Lockheed Corporation
11. LTV Aerospace and Defense Company
12. Martin Marietta Corporation
13. McDonnell Douglas Corporation
14. Motorola, Inc.
15. Oshkosh Truck Corporation

16. Raytheon Company
17. Rockwell International Corporation
18. The Singer Company
19. Texas Instruments, Inc.
20. UNISYS Corporation

AMICUS CURIAE

BRIEF

NO. 86-492

Supreme Court, U.S.

FILED

MAY 21 1987

JOSEPH F. SPANIOLO, JR.
CLERK

IN THE

Supreme Court of the United States

OCTOBER TERM, 1986

**DELBERT BOYLE, Personal Representative
Of The Heirs and Estate of David
A. Boyle, Deceased,**

Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

**ON WRIT OF CERTIORARI TO THE UNITED STATES
COURT OF APPEALS FOR THE FOURTH CIRCUIT**

**MOTION FOR LEAVE TO FILE A BRIEF AS
AMICUS CURIAE AND BRIEF FOR THE DEFENSE
RESEARCH INSTITUTE, INC. AS AMICUS CURIAE**

**Donald F. Pierce, Pres.
THE DEFENSE RESEARCH
INSTITUTE, INC.
750 North Lake Shore Dr.
Chicago, Illinois 60601
(312) 944-0575**

**James W. Morris, III
Counsel of Record
Ann Adams Webster
BROWDER, RUSSELL, MORRIS
and BUTCHER, P.C.
One James Center
Suite 1100
901 East Cary Street
Richmond, Virginia 23219
(804) 771-9300**

Attorneys for The Defense Research Institute, Inc.

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MOTION FOR LEAVE TO FILE A BRIEF
AS AMICUS CURIAE

The Defense Research Institute and Trial Lawyers Association (DRI), hereby respectfully moves for leave to file the attached brief amicus curiae in this case in support of respondent, as provided in Rules 36.3 and 42 of the Rules of this Court. The consent of the attorneys for the parties was requested but refused.

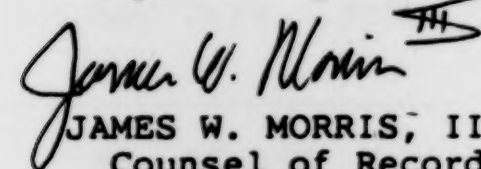
DRI is a national association of approximately 13,000 members. Our membership includes judges and professors of law, but primarily consists of individual trial attorneys in private practice and incorporate counsel offices. We usually represent defendants. DRI works to preserve and improve the civil justice system as a means of resolving disputes fairly, efficiently and promptly.

At the same time that DRI supports measures to increase resources allocated to the system, we also promote measures to limit new demands on the system. Seen broadly, this case presents, first, an issue of great importance to the civil justice system: What considerations should govern the determination whether traditional immunities and defenses will be honored or discarded when some of the circumstances in which they were previously applied have changed? Second, if traditional immunities and defenses are to be honored in this case, how should their application by the courts be changed to fit the new circumstances and still preserve the essential qualities of the immunity or defense?

The specific immunities and defenses at issue in this case are: sovereign immunity for discretionary decisions in the area of national security and defense, the common law independent contractor's defense, and the "fireman's rule." Should they continue to be honored notwithstanding new realities in the government (military) contracting process?

The parties to this action necessarily will concentrate on the peculiar facts of their case. In the brief tendered with this motion, DRI discusses the issues in the broader terms outlined here, asking the Court to preserve these immunities and defenses to the greatest possible extent in order to limit the runaway growth in the tort law caseload that already overburdens our courts.

Respectfully submitted,



JAMES W. MORRIS, III

Counsel of Record

ANN ADAMS WEBSTER

Browder, Russell, Morris
and Butcher, P.C.

One James Center

Suite 1100

901 E. Cary Street

Richmond, Virginia 23219

804-771-9300

Donald F. Pierce, President
The Defense Research Institute, Inc.
750 North Lake Shore Drive
Chicago, Illinois 60611
312-944-0575

Attorneys for The Defense
Research Institute, Inc.

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AS AMICUS CURIAE

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I. INTEREST OF AMICUS CURIAE

DRI's interest in this case, as set forth in the preceding motion, is in the preservation of traditional tort immunities and defenses in order to stem the runaway growth of tort claims. New demands on our civil justice system must be limited so that the system may do a better job of meeting existing expectations - necessary for it to survive.

If the Court adopts either the Eleventh Circuit's formulation of the military contractor defense in Shaw v. Grumman Aerospace Corp., 778 F.2d 736 (1985), petition for cert. filed, 54 U.S.L.W. 3632 (U.S. March 17, 1986) (No. 85-1529), or the formulation advocated by amicus curiae the

Association of Trial Lawyers of America (ATLA) instead of affirming the decision below, the practical effect would be to eliminate the military contractor defense and thereby authorize a new class of tort claims. The traditional immunities and defenses on which the military contractor defense is based would be seriously undermined. The opportunity this case presents to encourage our nation's litigants and courts to undertake the sometimes difficult chore of adapting traditional immunities and defenses to new circumstances, instead of discarding them, would be lost.

DRI adopts and endorses all the facts and arguments set forth in the briefs of respondent United Technologies Corporation (UTC) and

amici curiae The National Security Industrial Association, et al. (NSIA). The argument which follows, premised on the facts discussed in those briefs, focuses more precisely on the issues related to preservation of the relevant immunities and defenses.

II. SUMMARY OF ARGUMENT

The military contractor defense as articulated by the Fourth Circuit in the decision below should be affirmed because it is best suited to preserve the common law immunities and defenses from which it derives: sovereign immunity, the independent contractor's defense, and the "fireman's rule." The fact that the military today "contracts out" some design work that it used to do itself is not reason to discard

legal principles that barred recovery for service-connected injuries when the military was solely responsible for design. Instead, the common law immunities and defenses should be adapted to the new military contracting realities because they serve important and enduring purposes.

III. ARGUMENT

- A. THE IMMUNITIES AND DEFENSES APPLICABLE WHEN THE GOVERNMENT DID ALL DESIGN ITSELF SHOULD BE PRESERVED BECAUSE THE CONTRACTOR WHO PARTICIPATES IN DESIGN FUNCTIONS AS A DIVISION OR EXTENSION OF THE MILITARY, ALWAYS SUBJECT TO THE MILITARY'S TOTAL AUTHORITY.

Since World War II, the government has increasingly chosen to contract out much of the design work that the armed forces used to do themselves. That the government has the authority to do this

has not been questioned either by the parties or amici in this case, or by any court which has considered the military contractor defense. Moreover, the facts set forth by UTC and NSIA show that the government also has the authority to control every design-related act or omission and every design decision by every private entity with which it contracts.

The government's power to control the contractor is or can be exercised at any time - from before the beginning of the contractual relationship (the government may even "require [a] private contractor to accept military contracts," Bynum v. FMC Corp., 770 F.2d 556, 566 n. 13 (5th Cir. 1985) (citing Defense Production Act, 50 U.S.C. app. 2071(a))) to after the end

of the relationship, by seeking damages for breach of contract. As detailed in the UTC and NSIA briefs, the military controls or can control the private contractor during the design process by, e.g., establishing specifications, reviewing for approval or disapproval the contractor's specifications, stationing military personnel at the contractor's facility to review and inspect the work, prohibiting changes without change orders, and establishing and enforcing testing requirements.

In short, the military has total control. It has full discretion to permit, prohibit, sanction, or channel the contractor's "discretion." The contractor thus functions as a controlled division or extension of the military. If the military lets them,

and only as the military lets them, contractors today make design (including testing) decisions which in the past were made directly by the military. All their decisions are subject to change by the military.

This is not a new social endeavor, giving rise to new risks to third parties. The government has merely shifted some activities it once performed by itself to private parties chosen by it and acting under its direction, supervision and control.

- B. THE SAME IMMUNITIES AND DEFENSES APPLICABLE WHEN THE GOVERNMENT DESIGNS MILITARY EQUIPMENT IN-HOUSE SHOULD BE PRESERVED BECAUSE THE PURPOSES OF THESE LEGAL PRINCIPLES ARE EQUALLY APPLICABLE TO THE NEW CIRCUMSTANCES.

1. Sovereign Immunity Under the
Feres-Stencel Doctrine

To determine whether the traditional immunities and defenses should be preserved in the new circumstances, their purposes must be examined to see whether the need for them continues. This Court did just that in Feres v. United States, 340 U.S. 135, 71 S. Ct. 153 (1950), where the issue was whether the Federal Tort Claims Act (FTCA), 28 U.S.C. §§ 1346(b), 2671 et seq., waives sovereign immunity in order to permit servicemen to recover from their superior officers or the government for service-connected injuries.

Feres held that the purpose of the FTCA was not to create new causes of action, but simply to waive sovereign

immunity to allow claims under all the same circumstances in which one could sue a private individual in tort. To allow a soldier to sue the government would injure - not serve - this purpose because no private party "has power to conscript or mobilize a private army." 340 U.S. at 141-42, 71 S. Ct. at 157. Therefore claims based on facts sui generis to military service are barred by sovereign immunity. The FTCA did "not . . . visit the government with novel and unprecedented liabilities." 340 U.S. at 142, 71 S. Ct. at 157.

In Stencel Aero Engineering Corp. v. United States, 431 U.S. 666, 97 S. Ct. 2054 (1977), the Court again followed the same analytical approach - examination of the purposes of the immunity in light of the different

circumstances of Stencel - where a contractor sought indemnity from the government for damages it might have to pay an injured soldier. The Court explained the principal reason for refusing to drop sovereign immunity and subject the government to the "novel and unprecedented liabilities" raised by claims for service-connected injuries. Such litigation would place in issue "the degree of fault, if any, on the part of the government's agents and the effect upon the serviceman's safety. The trial would involve second-guessing military orders, and would often require members of the Armed Services to testify in court as to each other's decisions and actions." 431 U.S. at 673, 97 S. Ct. at 2059.

The purpose of sovereign (Feres-Stencel) immunity from suit for service-connected injuries is thus to prevent judicial second-guessing of the military's management decisions and to preserve essential military discipline. United States v. Shearer, 473 U.S. 52, 58, 105 S. Ct. 3039, 3043 (1985). The constitutional separation of powers requires that judges and juries not choose theories of liability, decree duties of care, or set standards of conduct that will govern military decisions about the design or testing of military equipment. As UTC argues, these are non-justiciable matters. Such acts or omissions by the military are and must be "subject always to civilian control of the Legislative and Executive Branches" which, of course,

are checked by the electorate.

Chappell v. Wallace, 462 U.S. 296, 302, 103 S. Ct. 2362, 2366 (1983) (emphasis in the original); see Shearer, 473 U.S. at 58, 105 S. Ct. at 3044.

This Court has already held that these reasons for immunity apply to bar suits for service-connected injuries regardless whether the suit is by a serviceman against the government or by a contractor for indemnity from the government in a serviceman's products liability suit. Stencel, 431 U.S. at 673, 97 S. Ct. at 2059. For exactly the same reasons, the Court should bar suits for service-connected injuries against a contractor who functions - as Sikorsky did in this case - as a controlled division or extension of the military. As long as the design

decisions at issue were controlled - or could have been controlled - by the government, the constitutional principles requiring judicial deference to civilian authority are fully implicated because trial of such cases would inevitably call into question the military's orders or failure to issue orders. See Stencel, 431 U.S. at 673, 97 S. Ct. at 2059; Bynum, 770 F.2d at 575.

Subjecting military contractors to liability for injuries arising from alleged design defects would empty the Feres-Stencel immunity doctrine of meaning. The doctrine exists to protect activity that is peculiar to the sovereign, e.g., military equipment design. It does not protect merely or only the government as actor, but also

private parties who engage in the activity subject to sovereign command; and the reason it protects the government and private contractors from judicial scrutiny is not because of who they are, but because the nature of the activity in question requires that it be subject to civilian political control.

2. The Common Law Contractor's Defense

This common law defense - called the independent contractor's or government contractor's defense - is based on Yearsley v. W. A. Ross Construction Co., 309 U.S. 18, 60 S. Ct. 413 (1940), and the Restatement (Second) of Torts § 404, Comment a (1965).

In Yearsley this Court upheld reversal of judgment for property damages allegedly caused by construction work performed, with military supervision, under government contract. Because the contractor's work was authorized and directed by the Executive Branch pursuant to valid legislation, there could be "no liability on the part of the contractor for executing [the government's] will." 309 U.S. at 21, 60 S. Ct. at 414.

The holding in Yearsley is consistent with the common law doctrine that an independent contractor is not liable for defects in, nor is he "required to sit in judgment on the plans and specifications . . . provided by his employer" - unless any competent contractor would see the defect.

Restatement (Second) of Torts § 404,
Comment a.

As UTC argues, "considerations of fairness" are why the contractor is not liable when it has acted in accordance with its employer's wishes. Yet this common law doctrine also recognizes the realities of contractual relationships as well as the need to apply considerations of fairness to those realities. To require contractors "to sit in judgment on the plans and specifications" of their employers would undermine their relationships.

To be sure, in the new circumstances of military contracting (supra, pp. 5-8), contractors like UTC/Sikorsky participate in equipment design. But the facts set forth in the

UTC and NSIA briefs show that the contractors act only in accordance with the government's wishes. Only the government - not the contractor - has the power to "sit in judgment on the plans and specifications" developed or used under a military contract. While the military may draw on its contractors' expertise, it brooks no questioning of its judgment except that which it requests or chooses to permit.

In the military contracting process, therefore, fairness considerations and respect for the contractual relationship still justify the common law contractor's defense: unless the contractor knows of a defect that seriously risks making the product unsafe, he is not liable for injury allegedly caused by defective plans or

specifications established according to his employer's wishes.

3. The Common Law "Fireman's Rule"

As UTC argues in its brief, the common law "fireman's rule" precludes recovery for injuries sustained on the job if the injury arises out of a risk inherent in the job. Of course, in most jobs some form of workers' compensation or disability insurance was part of the bargain struck by employee and employer before their relationship began. Thus servicemen are entitled to compensation for service-connected injuries under the Veterans' Benefits Act, 38 U.S.C. §§321 et seq. But having assumed certain professional risks, one cannot, if they materialize, shift more of their cost

to the employer than was originally bargained for.

In the new military contracting circumstances, in which the contractor sometimes operates as a "stand-in" for the armed services, the contractor must benefit from the fireman's rule just as the government does. This will ensure that the purposes of the fireman's rule - enforcement of assumption of risk and employment contract principles - will continue to be honored.

In summary, to expose the military contractor to liability would be to decrease the immunity and defenses that have always been allowed for government activity in the area of national security and defense.

C. THE FOURTH CIRCUIT'S
FORMULATION OF THE MILITARY
CONTRACTOR'S DEFENSE IS BEST
SUITED TO MEET THE PURPOSES
OF AND TO PRESERVE THE
TRADITIONAL IMMUNITIES AND
DEFENSES.

The purposes of the traditional immunities and defenses discussed above can be generalized as: to avoid judicial interference with activities which our legal system wants controlled primarily by non-judicial means. In place of control by litigation (including its threat), the political branches of government are to control military decisions (the Feres-Stencel immunity doctrine); contract principles are to control the relationship between the armed services and the private contractor (the contractor's defense); and contract and assumption of risk principles are to control the

relationship between the serviceman and the entity or entities that created his "workplace" conditions (the fireman's rule).

The military contractor's defense as formulated by the Fourth Circuit and the majority of courts that have considered it would preserve these traditional principles by serving this overriding purpose. On the other hand, the Eleventh Circuit's formulation of the defense in Shaw and ATLA's formulation as amicus here would both encourage active judicial second-guessing of military decisions and conduct. We very briefly summarize here the important differences between the majority formulation, which we advocate, and the Shaw-ATLA formulation.

The majority of courts require that the government have established or approved - e.g., by exchanging information in back-and-forth discussions with the contractor - reasonably precise specifications for the equipment. E. g., Boyle v. United Technologies Corp., 792 F.2d 413, 414 (4th Cir. 1986). This element establishes the government's power to control the design process, which is the necessary predicate to the Feres-Stencel immunity and common law contractor's defense. Shaw, 778 F.2d at 746, and ATLA, however, would require the contractor to prove that its role in the design specifications was nil or minimal (or to prove a proposed alternative prong of the defense discussed below). If this

requirement were allowed to stand, it would constitute unwarranted usurpation of the political branches' authority to determine the extent and manner of contracting out military work.

Next, the majority of courts require that the contractor prove that the equipment conformed to the specifications. E. g., Boyle, 792 F.2d at 414. This element establishes that the contractor did not breach its contractual obligations to the government, i.e., that it did in fact do what the government wanted. This shows that the government's control of the process, when it chose to exercise it, was effective. It also establishes the contractor's equitable entitlement to share in the immunities and defenses available to the government.

Finally, the majority of courts require that the contractor tell the government about dangers in the use of the equipment known to the contractor but not to the government. Boyle, 792 F.2d at 414. This element establishes that the exception to the common law contractor's defense for defects any competent contractor would recognize is not applicable. Shaw, 778 F.2d at 746, and ATLA, on the other hand, would require (unless the contractor can prove that its role in design was minimal) the contractor to prove that it warned the government of all dangers the contractor should have known about (Shaw) - or, taking a strict liability approach (ATLA), all dangers that allegedly materialized - and that the government nonetheless knowingly and

clearly directed the contractor to proceed with the work anyway.

This last Shaw-ATLA requirement is particularly inimical to the Feres-Stencel doctrine of sovereign immunity. It would subject to liability - under tort law principles that vary from state to state (including, e.g., widely divergent risks of incurring punitive damages awards) - any military design activity that may not satisfy a particular judge's or jury's view of what constitutes a "knowing" military decision to proceed with a design or "clear" communication of that decision to the contractor. This must not be allowed, for reasons best summarized by the Fifth Circuit:

Military authorities in deciding whether, when, and how to use military equipment must balance considerations of cost, time of production, risks of harm, the needs of our national defense, and other factors that touch upon such decisions. It is the balancing of these factors, not merely the nature of the information upon which that balance is predicated, that the government contractor defense seeks to exempt from challenge by servicemen in civilian courts.

Bynum, 770 F.2d at 575.

III. CONCLUSION

For the reasons stated, the Fourth Circuit Court of Appeals correctly decided this case. Its decision should be affirmed.

Respectfully submitted,

JAMES W. MORRIS, III
Counsel of Record
ANN ADAMS WEBSTER
Browder, Russell, Morris
and Butcher
One James Center, Suite 1100
901 E. Cary Street
Richmond, Virginia 23219
804-771-9300

Donald F. Pierce, President
The Defense Research Institute, Inc.
750 North Lake Shore Drive
Chicago, Illinois 60611
312-944-0575

Attorneys for Amicus Curiae
The Defense Research Institute, Inc.

AFFIDAVIT OF SERVICE

STATE OF VIRGINIA)
) To-wit:
CITY OF RICHMOND)

This day personally appeared
before me, Charlotte B. Ford, a Notary
Public in and for the City and State
aforesaid, James Watson Morris, III,
who after first being duly sworn
according to law made oath as follows:

1. That he is an attorney for
The Defense Research Institute, Inc.

2. That he is an applicant for
admission to the Bar of this Court.

3. That on May 21, 1987, 40
copies of the foregoing Motion and
Brief of the Defense Research
Institute, Inc., were mailed

first-class postage prepaid, to the
Clerk of the Supreme Court of the
United States and copies were served by
mail, first-class postage prepaid, upon
all parties required to be served:

ATTORNEYS FOR PETITIONER

Louis S. Franecke, Esquire
John O. Mack, Esquire
MACK, HAZLEWOOD, FRANECKE & TINNEY
221 Pine Street, Suite 600
San Francisco, CA 94104
(415) 391-1560

Michael Moore, Esquire
CARTWRIGHT, SUCHERMAN &
SLOBODIN, INC.
101 California Street, 26th Floor
San Francisco, CA 94111
(415) 433-0440

ATTORNEYS FOR RESPONDENT

Lewis T. Booker, Esquire
Richard H. Burton, Esquire
Lonnie D. Nunley, III, Esquire
HUNTON & WILLIAMS
707 East Main Street
P. O. Box 1535
Richmond, Virginia 23212
(804) 788-8200

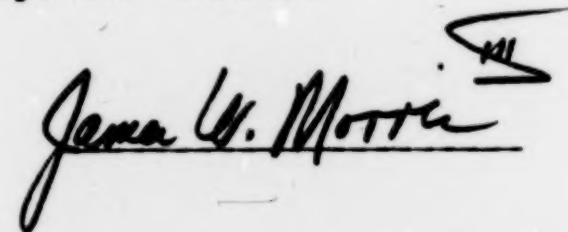
ATTORNEY FOR AMICUS CURIAE
NATIONAL SECURITY INDUSTRIAL
ASSOCIATION

Kenneth S. Geller, Esquire
MAYER, BROWN & PLATT
2000 Pennsylvania Avenue, N.W.
Washington, D.C. 20006

ATTORNEYS FOR AMICUS CURIAE
THE ASSOCIATION OF TRIAL
LAWYERS OF AMERICA

Dale Haralson, Esquire
Denneen L. Peterson
HARELSON, KINECK & MOREY, P.C.
82 South Stone Avenue
Tucson, Arizona 85701
(602) 792-4330

4. That the foregoing is true
and correct to the best of his
knowledge and belief.

A handwritten signature in cursive script, reading "James W. Morris". The signature is written in dark ink and is positioned above a horizontal line.

Subscribed and sworn to before me this
21st day of May, 1987.

My Commission expires: April 2, 1989

A handwritten signature in cursive script, reading "Charlotte B. Faid". The signature is written in dark ink and is positioned above the text "Notary Public".
Notary Public

AMICUS CURIAE

BRIEF

16
No. 86-492

Supreme Court, U.S.
FILED

MAY 21 1987

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In the Supreme Court of the United States

OCTOBER TERM, 1986

DELBERT BOYLE, Personal Representative
of the Heirs and Estate of
DAVID A. BOYLE,
Deceased,
Petitioner,

vs.

UNITED TECHNOLOGIES CORP.,
Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT
OF APPEALS FOR THE FOURTH CIRCUIT

**BRIEF AMICUS CURIAE OF GRUMMAN
AEROSPACE CORPORATION IN
SUPPORT OF RESPONDENT**

JAMES M. FITZSIMONS
Counsel of Record
MENDES & MOUNT
725 S. Figueroa Street
Los Angeles, California
90017
(213) 955-7700

CHARLES M. SHAFFER, JR.

L. JOSEPH LOVELAND

GARY J. TOMAN

KING & SPALDING

2500 Trust Company Tower

Atlanta, Georgia 30303

(404) 572-4600

FRANK J. CHIARCHIARO

DOUGLAS B. BESMAN

MENDES & MOUNT

3 Park Avenue

New York, New York 10016

(212) 951-2200

Counsel for Amicus Curiae

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OF APPEALS FOR THE FOURTH CIRCUIT

**BRIEF AMICUS CURIAE OF GRUMMAN
AEROSPACE CORPORATION IN
SUPPORT OF RESPONDENT**

Grumman Aerospace Corporation ("Grumman") respectfully files this brief amicus curiae in support of Respondent, United Technologies Corp. All parties have consented to the filing of this brief.

INTEREST OF THE AMICUS CURIAE

Grumman is a major supplier of military aircraft weapons systems used by the United States military. Over the last thirty years Grumman has manufactured and delivered approximately 4000 military aircraft to

the United States military. During this same period, Grumman has been the largest manufacturer of aircraft for naval aircraft carriers.

The activities of Grumman in designing and manufacturing these military weapons systems are directly and substantially related to the national defense of the United States. These aircraft weapons systems are frequently transported great distances and may be deployed by the military at any location. Moreover, after delivery of these weapons systems to the military, Grumman has no ability to influence deployment or use of the weapons system by the military. The ability of Grumman to produce weapons systems that address the needs of the military without incurring potential civil liability for injuries to servicemen resulting from alleged design defects will be directly affected by the Court's decision in this case. Accordingly, Grumman has a direct and substantial interest in the articulation of a uniform and meaningful national standard for the military contractor defense and thus has a direct and substantial interest in the outcome of this action.

Moreover, Grumman is presently petitioning this Court to grant certiorari in another action involving the proper standard for applying the military contractor defense to claims of defective design of military weapons systems (*Grumman Aerospace Corp. v. Edwin Lees Shaw*, No. 85-1529). In the *Shaw* case, the Eleventh Circuit Court of Appeals found that "although the Navy did formally approve Grumman's . . . specifications and design changes, that approval did not constitute the sort of informed military decision to accept the risk of a dangerous product to which this Court must defer under separation of powers doctrine." 778 F.2d 736, 747 (1985). In estab-

lishing a standard for the military contractor defense which is markedly different from that adopted by the Fourth Circuit in the instant case, the Eleventh Circuit in *Shaw* mandated judicial scrutiny of the military's decision and decision-making process to accept a weapons system for use. The standard adopted by the Fourth Circuit requires no such judicial scrutiny. Grumman therefore has a direct interest in this case because a determination by this Court as to the proper application of the military contractor defense will have a crucial impact upon Grumman's pending case.

SUMMARY OF ARGUMENT

This case presents two fundamental issues regarding the allocation of powers and responsibilities in the federal system. The first issue is whether the uniquely federal interests in the relationship between the United States military and the manufacturers of weapons systems requires that federal common law be applied in determining whether a military contractor may be held liable for injuries to servicemen resulting from alleged defects in the design of a weapons system approved and selected for use by the military. The power and responsibility to provide for the common defense is vested in the national government, rather than the states, *In re Tarble*, 80 U.S. (13 Wall) 397, 408 (1871), and "[t]he relationship between the Government and its suppliers of ordnance is . . . 'distinctively federal in character'" *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666, 672 (1977). Moreover, because "military authorities frequently move large numbers of men, and large quantities of equipment, from one end of the continent to the other, and beyond", *id.*, it makes no sense to allow

the situs of an accident to determine the applicable law. Instead, national interest requires that a uniform standard for the military contractor defense be applied in order to protect the relationship among the United States military, suppliers of weapons systems, and individual servicemen.

The second issue presented by this case is whether the doctrine of separation of powers prohibits the judiciary from second-guessing decisions of the United States military regarding the design and selection of weapons systems. The Fourth Circuit correctly recognized that the preservation and advancement of national defense interests requires a close working relationship between the military and the manufacturers of weapons systems. Further, the Executive and Legislative Branches, unlike the Judiciary, have the constitutional mandate and military expertise to make and evaluate the military decisions approving weapons system design. Judicial review of these decisions would also adversely affect military discipline and the procurement process. For these reasons, courts may not second-guess military determinations regarding the design and acceptance of weapons systems. Accordingly, the Fourth Circuit adopted the military contractor defense as set forth in *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984).

The *McKay* standard for the military contractor defense recognizes that, within the federal system, "[t]he complex, subtle, and professional decisions as to the composition, training, equipping, and control of a military force are essentially professional military judgments, subject *always* to civilian control of the Legislative and Executive Branches." *Gilligan v. Morgan*, 413 U.S. 1, 10 (1973) (emphasis original). Thus, the military con-

tractor defense advances the separation of powers recognition that "judges are not given the task of running the Army," *Orloff v. Willoughby*, 345 U.S. 83, 93 (1953), and safeguards the process of military procurement. *Tozer v. LTV Corp.*, 792 F.2d 403, 405 (4th Cir. 1986), *petition for cert. filed*, 55 U.S.L.W. 3337 (U.S. Oct. 23, 1986) (No. 86-674).

All of the Circuit Courts of Appeals that have recently considered the military contractor defense have recognized its constitutional underpinnings in separation of powers principles. The Third, Fourth, Fifth, Seventh, and Ninth Circuits have embraced an essentially uniform standard for application of this defense, based upon the decision in *McKay v. Rockwell International Corp.*, *supra*. The Eleventh Circuit has held that the military contractor defense is available in certain situations because traditional separation of powers doctrine compels the defense, *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736, 740 (11th Cir. 1985), *petition for cert. filed*, 54 U.S.L.W. 3032 (U.S. March 17, 1986) (No. 85-1529). Nonetheless, the Eleventh Circuit adopted a test for the military contractor defense that "turn[s] the assumption behind the *McKay* test on its head." *Shaw*, 778 F.2d at 746.

The *McKay* standard for the military contractor defense establishes a constitutionally acceptable and workable test for determining whether a military decision has been made with regard to the design of a weapons system. *McKay* requires a showing that the military established or approved reasonably precise specifications for a military weapons system and that the weapons system complied with those specifications before judicial deference is required. The *McKay* standard also requires that the military be provided with the same knowledge of risks and dangers in the design that the contractor

actually possesses in order to insure that the military makes its decisions on the basis of available information. The *McKay* standard stops short, however, of mandating the unconstitutional evaluation by the judiciary of military expertise and comprehension of contractor disclosures required by the Eleventh Circuit in *Shaw*.

Accordingly, this Court should adopt the *McKay* standard for the military contractor defense as a matter of federal common law.

ARGUMENT AND CITATION OF AUTHORITIES

I. FUNDAMENTAL PRINCIPLES OF FEDERALISM MANDATE THAT THE MILITARY CONTRACTOR DEFENSE BE DETERMINED AS A MATTER OF FEDERAL COMMON LAW.

The Fourth Circuit treated petitioner's claim as one which was governed in general terms by Virginia products liability law. *Boyle v. United Technologies Corp.*, 792 F.2d 413 (4th Cir. 1986). Nonetheless, the Fourth Circuit adopted, without discussion, the standard for the military contractor defense set forth in the companion case of *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986), *petition for cert. filed*, 55 U.S.L.W. 3337 (U.S. Oct. 23, 1986) (No. 86-674), a case arising under the Death on the High Seas Act, 46 U.S.C. § 761 *et seq.* As the following discussion demonstrates the Fourth Circuit was correct in utilizing this federal standard in the present case, because the parameters of the military contractor defense must be determined under federal common law in order to preserve the uniquely federal interest in the relationship between the United States military and the manufacturers of weapons systems.

A. The Relationship Between the Military and Manufacturers of Weapons Systems Is Controlled by National, Rather Than State, Interests.

One of the fundamental reasons for formation of the union, as set forth in the Preamble to the Constitution, was "to provide for the common defence". The power and responsibility for protecting the nation rests with the federal government, not the states. As early as 1871, this Court explained:

Now, among the powers assigned to the National government, is the power "to raise and support armies," and the power "to provide for the government and regulation of the land and naval forces." The execution of these powers falls within the line of its duties; and its control over the subject is plenary and exclusive. . . . *No interference with the execution of this power of the National government in the formation, organization, and government of its armies by any State officials could be permitted without greatly impairing the efficiency, if it did not utterly destroy, this branch of the public service.*

In re Tarble, 80 U.S. (13 Wall) 397, 408 (1871) (emphasis added).

The federal government's unique role in national defense extends to the relationship between the military and manufacturers of weapons systems. As this Court recognized in *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666 (1977):

The relationship between the Government and its suppliers of ordinance is certainly no less 'distinctively federal in character' than the relationship between the Government and its soldiers.

431 U.S. at 672. Indeed, the development, design, and deployment of state-of-the-art weapons systems have long been, and remain, vital aspects both of American national defense strategy and foreign policy planning. During the forty years since World War II, the explosion of scientific knowledge has underscored the strategic significance of maintaining at least technological parity in weapons systems. As the boundaries of scientific knowledge expand, "the United States is required by the exigencies of our defense effort to push technology towards its limits and thereby to incur risks beyond those that would be acceptable for ordinary consumer goods." *McKay v. Rockwell International Corp.*, 704 F.2d 444, 449-50 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984).

The direct relationship between national defense considerations and the development, design, and deployment of modern weapons systems is dramatically apparent from even a cursory review of news reports. The development, design and deployment of new weapons systems, such as the B-1B bomber, are the result of strategic defense planning. "As we analyzed the alternatives, our goal was a single new bomber that could rapidly redress the growing strategic imbalance and provide an enduring capability to penetrate Soviet defenses." Skantze, *B-1B: A Timely Lesson in Risk Management*, Aviation Week & Space Technology, March 23, 1987, at 11.¹ Moreover, even the nascent development of a new weapons system, such as the highly publicized Strategic Defense Initiative, or "Star Wars" program, can have a substantial impact upon a wide range of national policies, including international arms limitations treaties and discussions with allied na-

1. Gen. Lawrence A. Skantze, Commander, Air Force Systems Command, is responsible for Air Force research, development and weapons systems acquisition.

tions regarding the deployment of existing weapons systems.

Weapons systems are subject to deployment throughout the nation, and indeed throughout the world, based on national defense needs. Moreover, the manufacturers of military weapons systems, such as Grumman, respondent United Technologies, and others, work closely with the United States military in developing and designing weapons systems to meet these national needs and not localized concerns. Preservation of these national interests requires that federal common law govern actions that threaten to disrupt the relationship between the military and weapons systems manufacturers.

B. The Uniquely Federal Interest in Weapons Systems Development and Design Mandates Application of Federal Common Law to the Military Contractor Defense.

Because of the "distinctly federal" relationship between the United States military and manufacturers of military weapons systems, the question of whether those manufacturers should be subjected to liability to servicemen for alleged negligent or defective design of weapons systems must be decided by reference to federal common law rather than state law.

This Court has stated that, when a suit implicates "uniquely federal" interests, the presumption in favor of application of state law may be overcome and federal common law may be formulated to protect the federal interests. See *Banco Nacional de Cuba v. Sabbatino*, 376 U.S. 398, 426 (1964); see also *Wallis v. Pan American Petroleum Corp.*, 384 U.S. 63, 68 (1966) (explaining that federal common law should be applied where there is

"a significant conflict between some federal policy or interest and the use of state law.") The formulation and application of federal common law become imperative "where there is an overriding federal interest in the need for a uniform rule of decision or where the controversy touches basic issues of federalism." *Illinois v. City of Milwaukee*, 406 U.S. 91, 105 n.6 (1972). Applying this standard, the question of whether military equipment manufacturers should be liable for design defects must be governed by federal common law. See *Bynum v. FMC Corp.*, 770 F.2d 556, 570 (5th Cir. 1985); *In re "Agent Orange" Product Liability Litigation MDL No. 381*, No. 85-6163, slip op. at 5 (2d Cir. Apr. 21, 1987).²

The military contractor defense rests on two "distinctly federal" relationships, and the proper balancing of these relationships demands a uniform rule of decision that justifies application of federal common law. The first such relationship, as described in the preceding section, is the relationship between the manufacturers of weapons systems and the military. Weapons systems manufacturers produce equipment based upon the needs of the military, and the design of the weapons system evolves from a "continuous back-and-forth" between the manufacturers and the military. *Koutsoubos v. Boeing Vertol*, 755 F.2d 352, 355 (3d Cir.), cert. denied, 106 S. Ct. 72 (1985). After the equipment is manufactured and delivered to the military, however, the manufacturer has no say in the deployment or use of the equipment. Those matters are instead dictated by the needs of our national defense. "It would be anomalous for a company to be held liable by a state or federal court for selling a product

2. Copies of the two *Agent Orange* decisions cited herein that were handed down on April 21, 1987, No. 85-6163 and No. 84-6273, have been filed with the Clerk of this Court.

ordered by the federal government, particularly when the company could not control the use of that product." *In re "Agent Orange" Product Liability Litigation MDL No. 381*, No. 84-6273, slip op. at 7 (2d Cir. Apr. 21, 1987).

A second "distinctly federal" relationship implicated by the military contractor defense is the relationship between the military and individual servicemen. In *United States v. Standard Oil Co.*, 332 U.S. 301 (1947), this Court explained:

Perhaps no relation between the Government and a citizen is more distinctively federal in character than that between it and members of its armed forces. To whatever extent state law may apply to govern the relations between soldiers or others in the armed forces and persons outside them or nonfederal governmental agencies, the scope, nature, legal incidents and consequences of the relation between persons in service and the Government are fundamentally derived from federal sources and governed by federal authority.

332 U.S. at 305-306 (emphasis added). The Court also explained that federal common law applied to the United States' claim for injuries to a serviceman by an outsider, because the federal interests that controlled the relationship between the serviceman and the military also governed a claim "to protect the relation once formed from harms inflicted by others." 332 U.S. at 306.

Determination of the proper scope and application of the military contractor defense ultimately requires the formulation of a policy that carefully considers each of these two "distinctly federal" relationships. Providing the military with advanced weapons systems to protect the nation and providing for the welfare of injured ser-

vicemen are both matters in which the federal government has a unique and significant interest. The formulation and application of the military contractor defense will necessarily implicate both of these uniquely federal concerns, because "[o]ften dangerous designs must be used in the military context to meet the exigencies of our national defense, and even military equipment that is relatively safe for every day use may have to be operated on occasion under dangerous conditions or in a manner creating a high risk of harm." *Bynum v. FMC Corp.*, 770 F.2d at 569. Moreover, as this Court has explained:

The Armed services perform a unique, nationwide function in protecting the security of the United States. To that end military authorities frequently move large numbers of men, and large quantities of equipment, from one end of the continent to the other, and beyond.

Stencel, 431 U.S. at 672. Given the fact that the federal government controls the deployment of both servicemen and weapons systems, "it makes no sense to permit the fortuity of the situs" of an accident to determine the applicable law and thereby control the determination of these federal interests. *Id.* Instead, a uniform rule of decision should be formulated and applied under federal common law.

In addition to implicating "uniquely federal" interests in these two underlying relationships, the military contractor defense also "touches basic issues of federalism", the second part of the rationale articulated by this Court for application of federal common law. *Illinois v. City of Milwaukee*, 406 U.S. at 105 n.6. In the area of national defense, there is no compelling reason for adoption

of state law. Indeed, "the inner logic of federalism does not require state solutions to problems which affect each state alike and affect the nation as a whole more than any particular state." Comment: *The Federal Common Law*, 82 Harv. L. Rev. 1512, 1521 (1969). On the other hand, variations in state law on the military contractor defense, if allowed to exist, could erode entirely the purpose of the military contractor defense. As this Court has explained in dealing with the analogous area of judicial deference in the foreign policy field:

Whatever considerations are thought to predominate, it is plain that the problems involved are uniquely federal in nature. If federal authority, in this instance this Court, orders the field of judicial competence in this area for the federal courts, and the state courts are left free to formulate their own rules, the purposes behind the doctrine could be as effectively undermined as if there had been no federal pronouncement in the subject.

Banco Nacional de Cuba v. Sabbatino, 376 U.S. at 424.

In summary, within the federal system, the relationship among manufacturers of equipment, the military, and individual servicemen is distinctively federal in character, justifying the formulation and application of federal common law.³

3. The Solicitor General, in response to this Court's invitation, expressed the views of the United States in a brief filed in *Grumman Aerospace Corp. v. Shaw*, No. 85-1529. The Solicitor General agreed that federal common law should apply to a serviceman's claim against a contractor, noting that "a suit by a serviceman against one of the government's suppliers of ordnance gives rise to uniquely federal interests sufficient to warrant the imposition of federal law." Brief for the United States as Amicus Curiae at 9, *Grumman Aerospace Corp. v. Shaw*, No. 85-1529.

II. SEPARATION OF POWERS INTERESTS PRECLUDE THE JUDICIARY FROM EVALUATING AND PASSING JUDGMENT ON THE DESIGN OF WEAPONS SYSTEMS APPROVED BY THE MILITARY.

Freedom from judicial scrutiny of the military's decisions regarding the selection, design, and procurement of the military weapons systems that are used by American servicemen is essential to the effective operation of the military. The Executive and Legislative branches, unlike the Judiciary, possess the constitutional mandate and the military expertise to make and evaluate those decisions. Judicial second-guessing of these military decisions regarding weapons systems design, development, and procurement would violate separation of powers and would disrupt the military. The military contractor defense as applied by the court below and several other courts of appeals⁴ appropriately recognizes and prevents judicial second-guessing of military weapons design decisions.

A. Decisions Regarding the Design and Acceptance of Military Weapons Systems Are Committed to the Expertise of the Military and the Political Branches of Government.

This Court has resisted efforts to immerse the judiciary in military affairs. Relying on the constitutional allocation of authority over military matters to the Exec-

4. See *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986); *Bynum v. FMC Corp.*, 770 F.2d 556, 565 (5th Cir. 1985); *In re Air Crash Disaster at Mannheim, Germany*, 769 F.2d 115, 121 (3d Cir. 1985), cert. denied, 106 S. Ct. 851 (1986); *Tillett v. J.I. Case*, 756 F.2d 591, 597 (7th Cir. 1985); *Koutsoubos v. Boeing Vertol*, 755 F.2d 352, 354-355 (3d Cir.), cert. denied, 106 S. Ct. 72 (1985).

utive and Congress, the lack of military expertise or standards to facilitate judicial review, and the disruption of the military that would be entailed, the Court has ruled that the judiciary may not second-guess military decisions. See *Gilligan v. Morgan*, 413 U.S. 1, 8-11 (1973) (citing *Baker v. Carr*, 369 U.S. 186 (1962)); *Orloff v. Willoughby*, 345 U.S. 83 (1953).⁵

In *Gilligan*, the Court applied this reasoning in refusing to allow a suit seeking judicial evaluation and surveillance of the "training and weaponry" of the military. Because these matters were within the responsibility and expertise of Congress and the Executive Branch, the Court concluded that "any such relief, whether it prescribed standards of training and weaponry or simply ordered compliance with the standards set by Congress and/or the Executive, would necessarily draw the courts into a nonjusticiable political question, over which we have no jurisdiction." *Id.* at 9 (emphasis by the Court).

With similar reasoning, this Court has rejected claims under the Federal Tort Claims Act that would call into question military judgments. See *United States v. Shearer*, 473 U.S. 52, 54-56 (1985); *Chappell v. Wallace*, 462 U.S. 296, 300 (1983); *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666 (1977); *Feres v. United States*, 340 U.S. 135 (1950). The guiding prin-

5. In *Baker*, this Court directed that in evaluating whether to refrain from interfering with a decision made by another branch of the government, the courts should consider whether there is "a textually demonstrable constitutional commitment of the issue to a coordinate political department; or a lack of judicially discoverable and manageable standards for resolving it; . . . or the impossibility of a court's undertaking independent resolution without expressing lack of the respect due coordinate branches of government; . . . or the potentiality of embarrassment from multifarious pronouncements by various departments on one question." 369 U.S. at 217.

ciple is judicial deference to military decisions. See *Rostker v. Goldberg*, 453 U.S. 57, 64-66 (1981) ("perhaps in no other area has the Court accorded Congress greater deference.") In sum, "[o]rderly government requires that the judiciary be as scrupulous not to interfere with legitimate Army matters as the Army must be scrupulous not to intervene in judicial matters." *Orloff v. Willoughby*, 345 U.S. at 94.

Military decisions approving the design of weapons systems selected for use by servicemen involve the same analysis. As the Court recognized in *Gilligan*, "the complex, subtle, and professional decisions as to the . . . equipping . . . of a military force are essentially professional military judgments, subject *always* to civilian control of the Legislative and Executive Branches. 413 U.S. at 10.

The process of developing and designing military weapons systems requires a close working relationship between the military and the contractor. Some courts have described this process as a "continuous back-and-forth" between the military and the contractor. *Koutsoubos v. Boeing Vertol*, 755 F.2d 352, 355 (3d Cir.), *cert. denied*, 106 S. Ct. 72 (1985). "Military contractors ordinarily work so closely with the military . . . that it is nearly impossible to contend that the contractor defectively designed a piece of equipment without actively criticizing a military decision." *Tozer v. LTV Corp.*, 792 F.2d at 406. See *Bynum v. FMC Corp.*, 770 F.2d 556, 569 (5th Cir. 1985).

Military judgments are especially critical to the task of reconciling the military mission of the weapons system with available technology. Thus, "the United States is required by the exigencies of our defense effort to push

technology toward its limits and thereby to incur risks beyond those that would be acceptable for ordinary consumer goods." *McKay v. Rockwell International Corp.*, 704 F.2d 444, 449-50 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984). As stated previously, the development, design and deployment of new weapons systems, such as the B-1B bomber, are the result of strategic defense planning.

To expedite fielding the B-1B, the risk was our conscious decision to produce the aircraft while it was still being developed

Our military capability is absolutely dependent on developing and fielding the highest-technology systems our scientific base can offer. It is the only effective tool we have to counter an adversary who consistently outspends, outproduces and outnumbers us. That means taking prudent risks that translate to a great deal of technological leverage and ultimately superior combat capability. *We cannot accept a 'no risk' policy in acquiring and fielding weapons systems, for 'no risk' means 'no payoff'.*

Skantze, *B-1B: A Timely Lesson in Risk Management*, *supra*, at 11 (emphasis added).

The decisions regarding what risks are acceptable cannot be evaluated by civilian standards generally applied by the judiciary. "Difficult choices, trade-offs and compromises inhere in military planning that simply find no analogue in civilian life." *Tozer v. LTV Corp.*, 792 F.2d at 406. As this Court has recognized:

Trained professionals, subject to the day-to-day control of the responsible civilian authorities, necessarily must make comparative judgments on the merits as

to evolving methods of . . . equipping . . . military forces with respect to their duties under the Constitution. It would be inappropriate for a district judge to undertake this responsibility in the unlikely event that he possessed requisite technical competence to do so.

Gilligan v. Morgan, 413 U.S. at 8. Indeed, "it would be a rare juror - or judge - who has been in the cockpit of a Navy RF-8G off the deck of a carrier on a low level, high speed fly-by maneuver." *Tozer v. LTV Corp.*, 792 F.2d at 406. "[I]t is difficult to conceive of an area of governmental activity in which the courts have less competence." *Gilligan v. Morgan*, 413 U.S. at 10.

B. The Effect of Judicial Second-Guessing of Military Decisions Regarding the Design and Acceptance of Weapons Systems Would Affect Military Discipline and Disrupt the Procurement Process.

Requiring the courts to evaluate and to pass judgment on the military decisions selecting and approving the design of weapons systems would involve second-guessing of these military decisions and would adversely affect military operations in at least two major ways.

First, second-guessing of these military decisions would have an adverse effect on military discipline. Judicial review of the design decisions would necessarily "require members of the Armed Services to testify in Court as to each other's decisions and actions." *Tozer v. LTV Corp.*, 792 F.2d 403, 406 (4th Cir. 1986) (quoting *Stencel*, 431 U.S. at 673). It would require that "commanding officers would have to stand prepared to convince a civilian court of the wisdom of a wide range of military . . . decisions." *United States v. Shearer*, 473 U.S. 52, 58 (1985). The

specter of military officers being called into a civilian court and subjected to detailed cross-examination regarding military decisions and judgments involved in making design decisions would have a chilling effect. Classified weapons systems, designed and developed to advance the national security interests of this country, would be held up to public scrutiny and evaluated in a constitutionally unacceptable forum. Moreover, a declaration by a court that an established weapons system which has been in service for many years contains an inherent design defect would no doubt disrupt the confidence of military personnel in their equipment and leadership.

The effect on discipline is the same in suits by servicemen against contractors as that occurring in suits by the servicemen directly against the government.

Litigation involving defective designs in military products would take the identical form regardless of whether the named defendant happens to be the government or the military contractor. In either case, members of the armed services would be allowed to question military decisions and obtain relief from actions of military officers.

Bynum v. FMC Corp., 770 F.2d at 565.

Second, judicial second-guessing of military design decisions would disrupt the process of development, design, and deployment of weapons systems.⁶ Evaluation of these military decisions by courts using civilian standards would interfere with the "[d]ifficult choices, trade-offs and compromises" inherent in military planning. See *Tozer v. LTV Corp.*, 792 F.2d at 406. "Moreover, military activities involve high stakes, and common concepts of risk avereness

6. See Brief of the United States in *Grumman Aerospace Corp. v. Shaw*, No. 85-1529 at 12, 17.

are of no relevance. To expose private companies generally to lawsuits for injuries arising out of the deliberately risky activities of the military would greatly impair the procurement process and perhaps national security itself." *In re "Agent Orange" Product Liability Litigation MDL No. 381*, No. 84-6273, slip op. at 11 (2d Cir. Apr. 21, 1987). Suits by servicemen alleging a design defect in a weapons system approved by the military are "the type of claims that, if generally permitted, would involve the judiciary in sensitive military affairs at the expense of military discipline and effectiveness." *United States v. Shearer*, 473 U.S. 52, 59 (1985) (emphasis in original). Accordingly, adoption of a military contractor defense is necessary and appropriate.

III. THE STANDARD ARTICULATED IN MCKAY IS MANDATED BY THE SEPARATION OF POWERS INTERESTS THAT UNDERLIE THE MILITARY CONTRACTOR DEFENSE.

In *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984), the Ninth Circuit articulated a well-reasoned and appropriate standard for the military contractor defense. The standard was developed in light of the separation of powers concerns over injecting the courts into the process of military weapons design and procurement, and it successfully safeguards those concerns. The *McKay* court concluded as follows:

[W]e hold that under the *Feres-Stencel* doctrine and the government contractor rule, a supplier of military equipment is not subject to section 402A liability for a design defect where: (1) the United States is immune from liability under *Feres* and *Stencel*, (2) the supplier proves that the United

States established, or approved, reasonably precise specifications for the allegedly defective military equipment, (3) the equipment conformed to those specifications, and (4) the supplier warned the United States about patent errors in the government's specifications or about dangers involved in the use of the equipment that were known to the supplier but not to the United States.

704 F.2d at 451. Amicus urges that this Court adopt the *McKay* standard for the military contractor defense.

Under *McKay*, a contractor is not liable when a serviceman claims that he was injured as a result of a design defect in a weapons system if four conditions are met.

The first prong, requiring that the United States be immune under *Feres* and *Stencel*, helps to ensure that the policies against second-guessing underlying *Feres* and *Stencel* are applicable to the particular case.

The second prong of *McKay* requires that the United States established or approved reasonably precise specifications for the allegedly defective design. This factor ensures that separation of powers concerns are truly invoked and that military judgments are truly implicated.

Approval of design specifications can take several forms. The second prong of *McKay* can be met where the military actually reviewed and formally approved a detailed set of specifications. *In re Air Crash Disaster at Mannheim, Germany*, 769 F.2d 115, 122 (3d Cir. 1985), *cert. denied*, 106 S. Ct. 851 (1986). Approval can also occur through the "continuous back-and-forth" between the military and the contractor." *Tozer v. LTV Corp.*, 792 F.2d at 407 (quoting *Koutsoubos*, 755 F.2d at 355).

Where the military and the contractor work closely in developing specifications for the weapons system, there is genuine participation by the military in the design and thus approval of the design specifications. *Id.* at 407, 408. Finally, approval can occur through the military's actual experience with the weapons system and its decision to continue using it. *Dowd v. Textron, Inc.*, 792 F.2d 409, 412 (4th Cir. 1986); *petition for cert. filed*, 55 U.S.L.W. 3176 (U.S. Sept. 6, 1986) (No. 86-379). Whatever reasons the military may have for making its decisions, it is not up to the Court or jury to second-guess this military judgment. *Id.*

Underlying this prong of *McKay* is a recognition of the relationship between the military and the contractor in the weapons systems procurement process. There is necessarily constant interaction between the contractor and the military in that process because of the military imperatives involved in the selection of the particular design. Since the military exercises ultimate control over the approval and the implementation of the design specifications, "where approval occurs, it is not possible to review these decisions without second-guessing command decisions". *Tozer v. LTV Corp.*, 792 F.2d at 406.

Petitioner relies upon the formulation of the military contractor defense stated in *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985). Under the first alternative test of *Shaw*, a contractor must prove "that it did not participate, or participated only minimally, in the design of those products or parts of products shown to be defective." *Id.* at 746.

This requirement ignores the close work relationship between the military and the contractor, and the "continuous back-and-forth" between them described in

Koutsoubos v. Boeing Vertol, 755 F.2d 352, 355 (3d Cir.), *cert. denied*, 106 S. Ct. 851 (1985). The exchange of concepts, proposals, drawings, test results, and in-service experience between the military and the contractor throughout the design process is essential if a new weapons system is to mesh the latest technology with the needs of the military and the budgetary constraints imposed by the military. Not only does the first element of the *Shaw* test overlook the importance of this detailed interaction, but, more importantly, it actually provides a direct incentive for manufacturers not to participate in the design process, a result that would unquestionably harm the nation's defense.

The third prong of *McKay* requires that the weapons system conform to the specifications that were approved by the military. As applied by the courts of appeals, this prong requires that the challenged defect was a product of military-approved design. See *Bynum v. FMC Corp.*, 770 F.2d at 574 n.23.

The fourth prong of *McKay* requires the contractor to inform the military about patent errors in the government's specifications or about dangers involved in the use of the equipment that were known to the contractor but not to the United States. *McKay*, 704 F.2d at 451.

Contrary to the assertions of petitioner, this standard is equivalent to that of *Koutsoubos* and *Agent Orange*, which require that the government's knowledge of the hazard be "as much as or more" than the contractor. In *re "Agent Orange" Product Liability Litigation*, 534 F. Supp. 1046, 1055 (E.D.N.Y. 1982). Both standards require that the military be provided with the same knowledge of dangers involved in the use of equipment that the contractor actually possesses to enable the military to make its decisions on the basis of available information.

A supplier, therefore, has a duty to inform the military of known risks attendant to a particular weapon that it supplies, so as to provide the military with at least an opportunity fairly to balance the weapon's risks and benefits. This principle would not impose upon a supplier any duty of testing that was not included in the specifications. It merely would require the supplier to share with the military the extent of a supplier's knowledge about the hazards of the product being purchased.

Agent Orange, 534 F. Supp. at 1055. It is only if the contractor concealed or failed to disclose to the military information about dangers of which the military was ignorant but which the contractor had actual knowledge, that the contractor would fail to satisfy that element of the military contractor defense. See *Agent Orange*, 534 F. Supp. at 1057; *In re "Agent Orange" Product Liability Litigation* MDL No. 381, No. 85-6163, slip op. at 5 (2d Cir. Apr. 21, 1987).⁷

Petitioners argue for the adoption of the *Shaw* test, the second prong of which requires that the contractor "timely warned the military of the risks of the design and notified it of alternative designs reasonably known by the contractor, and that the military, although forewarned, clearly authorized the contractor to proceed with the dangerous design." *Shaw v. Grumman Aerospace Corp.*, 778 F.2d at 746 (emphasis original).

7. While the Second Circuit in one of its recent *Agent Orange* decisions, No. 85-6163, found it unnecessary to define the precise contours of the military contractor defense, slip op. at 11, it stated that the defense applies where the contractor "informs the government of known hazards or the information possessed by the government regarding those hazards is equal to that possessed by the contractor." *Id.* at 5.

The amount of testing and analysis of the design of a weapons system is dictated by the military. Further, the military is itself a sophisticated participant in the design process. The design alternatives explored and the time and care taken to evaluate each design characteristically depend on uniquely military considerations. These include urgency, available alternative systems and their delivery schedules, as well as other objectives such as intended use and method of operation, and similar factors. "Most weapons systems are devised with a specific tactical or strategic mission in mind, and time is often of the essence. Not only the precise specifications, but the time schedule of production and the type and number of tests conducted are bargained-for aspects of the contractual relationship." Brief of the United States as Amicus Curiae in *Grumman Aerospace Corp. v. Shaw*, No. 85-1529, at 16.

Judicial review of whether further testing and analysis should have been performed would necessarily require second-guessing of the merits of military decisions during the design process. A judicial standard that would require evaluation of whether the contractor disclosed risks that should reasonably have been known fails to take into account the role of the military in the design process.⁸

In addition, the *Shaw* test requires that "[a]uthorization . . . must be knowing," *Shaw v. Grumman Aerospace Corp.*, 778 F.2d at 746, and that a "blanket product approval from the government" is not sufficient. *Id.* at 746 n.18. Indeed, the Eleventh Circuit stated that "the court may take into account evidence that goes to the military's own level of relevant knowledge and expertise." *Id.* at 746.

8. The court of appeals in *Bynum v. FMC Corp.*, 770 F.2d 556, 576 (5th Cir. 1985), expressly rejected such a standard.

Thus, the Eleventh Circuit's test would require a district court to evaluate not only whether the military *actually* approved a weapons system's design but also whether it *should have* approved the design at all. If the court considers a design defective, it can simply disregard the *fact* of military approval by concluding that the military lacked sufficient knowledge and expertise to make a "knowing" assessment of the risks.

The practical implications of this test are staggering. A contractor asserting the military contractor defense under the *Shaw* standard will be required to prove not only that the military approved a design, but also that the military's representatives were in fact competent to give such approval. Thus, attempting to satisfy the *Shaw* standard would virtually ensure the creation of a new, mountainous paper record in connection with every procurement contract, and would cause a practical and substantial alteration in the procurement process. See Brief for the United States as Amicus Curiae in *Grumman Aerospace Corp. v. Shaw*, No. 85-1529, at 19. On the other hand, the plaintiff—an injured serviceman or his representative—is provided with a direct incentive to challenge the "military's own level of relevant knowledge and expertise" in order to invalidate approval of the design. *Shaw* at 746. The specter of military officers being called into a civilian court and subjected to detailed cross-examination as to their "relevant knowledge and expertise" regarding design decisions is certainly not contemplated by the Constitution.

The *McKay* test avoids these pitfalls. Under *McKay*, once it is shown that the military has approved the design specifications with knowledge of the dangers involved in the use of the equipment that is equal to that of the contractor, the inquiry ends. The courts cannot

go behind that approval to attack the competence of the military decision-makers.

In sum, the *McKay* test adequately and reasonably safeguards the separation of powers interests at stake in litigation by servicemen over alleged design defects in military weapons systems.

CONCLUSION

The judgment of the Court of Appeals should be affirmed.

Respectfully submitted,

JAMES M. FITZSIMONS
Counsel of Record
MENDES & MOUNT
725 S. Figueroa Street
Los Angeles, California
90017

(213) 955-7700

CHARLES M. SHAFFER, JR.
L. JOSEPH LOVELAND
GARY J. TOMAN
KING & SPALDING
2500 Trust Company Tower
Atlanta, Georgia 30303
(404) 572-4600

FRANK J. CHIARCHIARO
DOUGLAS B. BESMAN
MENDES & MOUNT
3 Park Avenue
New York, New York 10016
(212) 951-2200

• Counsel for Amicus Curiae

DOCKET

No. 86-492-CFX
Status: GRANTED

Title: Delbert Boyle, Personal Representative of the heirs
and Estate of David A Boyle, Deceased, Petitioner
v.
United Technologies Corporation

Docketed:

September 23, 1986 Court: United States Court of Appeals
for the Fourth Circuit

See also:

85-1529
86-379

Counsel for petitioner: Franecke, Louis S.

Counsel for respondent: Booker, Lewis T., Lacovara, Philip A.

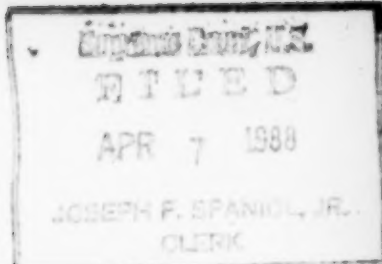
Entry	Date	Note	Proceedings and Orders
1	Sep 23 1986	G	Petition for writ of certiorari filed.
2	Oct 6 1986		Brief of respondent United Technologies Corp. in opposition filed.
3	Oct 8 1986		DISTRIBUTED. October 31, 1986
5	Nov 25 1986		REDISTRIBUTED. December 12, 1986
7	Dec 22 1986		REDISTRIBUTED. January 9, 1987
8	Jan 12 1987		Petition GRANTED. Justice Powell OUT. *****
9	Feb 5 1987		Record filed.
10	Feb 5 1987		Certified copy of original record and proceedings, 9 volumes, received.
11	Feb 25 1987	G	Motion of Joan S. Tozer, et al. for leave to file a brief as amici curiae filed.
12	Feb 25 1987		Brief amicus curiae of Edwin Lees Shaw filed.
13	Feb 25 1987		Joint appendix filed. * Vols. I and II
14	Feb 25 1987		Brief of petitioner Delbert Boyle filed.
15	Feb 25 1987		Brief amicus curiae of Assn. of Trial Lawyers of America filed.
16	Mar 9 1987		Motion of Joan S. Tozer, et al. for leave to file a brief as amici curiae GRANTED. Justice Powell OUT.
18	Mar 12 1987		Order extending time to file brief of respondent on the merits until April 29, 1987.
19	Apr 17 1987		Order further extending time to file brief of respondent on the merits until May 21, 1987.
20	May 18 1987	G	Motion of Bell Helicopter Textron Inc. for leave to file a brief as amicus curiae filed.
21	May 21 1987		Brief of respondent United Technologies Corp. filed.
22	May 21 1987	G	Motion of Chamber of Commerce of the United States for leave to file a brief as amicus curiae filed.
23	May 21 1987	G	Motion of UNR Industries, Inc. for leave to file a brief as amicus curiae filed.
24	May 21 1987		Brief amicus curiae of Grumman Aerospace Corp. filed.
25	May 21 1987	G	Motion of Defense Research Institute, Inc. for leave to file a brief as amicus curiae filed.
26	May 21 1987	G	Motion of Product Liability Advisory Council, Inc., et al. for leave to file a brief as amici curiae filed.
29	May 21 1987		Brief amici curiae of Natl. Security Industrial Assn., et al. filed.
30	May 21 1987		Brief amicus curiae of United States filed.
27	May 22 1987		Lodging received.

Entry	Date	Note	Proceedings and Orders
28	Jun 1 1987		Motion of Bell Helicopter Textron Inc. for leave to file a brief as amicus curiae GRANTED. Justice Powell OUT.
31	Jun 2 1987	D	Motion of petitioner for additional time for oral argument filed.
36	Jun 5 1987	G	Motion of the Solicitor General for leave to participate in oral argument as amicus curiae and for divided argument filed.
32	Jun 8 1987		Motion of Chamber of Commerce of the United States for leave to file a brief as amicus curiae GRANTED. Justice Powell OUT.
33	Jun 8 1987		Motion of UNR Industries, Inc. for leave to file a brief as amicus curiae GRANTED. Justice Powell OUT.
34	Jun 8 1987		Motion of Defense Research Institute, Inc. for leave to file a brief as amicus curiae GRANTED. Justice Powell OUT.
35	Jun 8 1987		Motion of Product Liability Advisory Council, Inc., et al. for leave to file a brief as amici curiae GRANTED. Justice Powell OUT.
37	Jun 15 1987		Motion of petitioner for additional time for oral argument DENIED. Justice Powell OUT.
38	Jun 15 1987		Motion of the Solicitor General for leave to participate in oral argument as amicus curiae and for divided argument GRANTED. Justice Powell OUT.
39	Jul 1 1987		CIRCULATED.
40	Jul 10 1987	G	Motion of Chamber of Commerce of the U.S. for leave to file supplemental brief filed.
41	Jul 20 1987		SET FOR ARGUMENT. Tuesday, October 13, 1987. (2nd case).
42	Aug 26 1987		Motion of Chamber of Commerce of the U.S. for leave to file supplemental brief GRANTED.
43	Sep 9 1987	X	Reply brief of petitioner Delbert Boyle filed.
44	Oct 2 1987	X	Supplemental brief of respondent United Technologies Corp. filed.
45	Oct 6 1987	D	Motion of Edwin Dees Shaw for leave to submit supplemental authority filed.
46	Oct 13 1987		Motion of Edwin Dees Shaw for leave to submit supplemental authority DENIED.
47	Oct 13 1987		ARGUED.
48	Feb 22 1988		The case is restored to the calendar for reargument.
49	Mar 7 1988		The parties may file supplemental briefs on reargument, provided the briefs do not exceed 20 pages. Amici curiae may file supplemental briefs on reargument provided the briefs do not exceed 10 pages. Such briefs shall be served and filed on or before close of business Wednesday, April 13, 1988.
50	Mar 11 1988		SET FOR REARGUMENT, Wednesday, April 27, 1988. (3rd case).
51	Mar 18 1988	D	Motion of Joan Tozer for leave to participate in oral argument as amicus curiae and for divided argument filed.
52	Mar 28 1988		Motion of Joan Tozer for leave to participate in oral argument as amicus curiae and for divided argument

Entry	Date	Note	Proceedings and Orders
			DENIED.
53	Apr 7 1988	X	Brief amicus curiae of Edwin Lees Shaw on reargument filed.
54	Apr 8 1988	X	Supplemental brief of petitioner Delbert Boyle filed.
55	Apr 11 1988	X	Supplemental brief of United States filed.
57	Apr 12 1988	X	Supplemental brief of Bell Helicopter Textron, Amicus Curiae, filed.
58	Apr 12 1988	X	Supplemental brief of Grumman Aerospace Corp., Amicus Curiae, filed.
60	Apr 12 1988	X	Supplemental brief of Natl. Security Industrial Assn., et al., Amici Curiae, filed.
63	Apr 12 1988	X	Brief amici curiae of Aerospace Industries Assn., et al. filed.
56	Apr 13 1988	X	Supplemental brief of respondent United Technologies Corp. filed.
59	Apr 13 1988	X	Supplemental brief of Chamber of Commerce of US, Amicus Curiae, filed.
61	Apr 13 1988	X	Supplemental brief of Joan S. Tozer, et al. filed.
62	Apr 13 1988	X	Brief amicus curiae of Assn. of Trial Lawyers of America filed.
64	Apr 27 1988		REARGUED.

SUPPLEMENTAL BRIEF

2
CASE NO. 86-492



In the Supreme Court of the United States

OCTOBER TERM, 1987

DELBERT BOYLE, as personal representative of
the estate of David A. Boyle, deceased,
Petitioner,

vs.

UNITED TECHNOLOGIES CORPORATION,
Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT
OF APPEALS FOR THE FOURTH CIRCUIT

**SUPPLEMENTAL BRIEF ON REARGUMENT FOR
EDWIN LEES SHAW, AS AMICUS CURIAE
IN SUPPORT OF PETITIONER**

JOEL D. EATON, ESQUIRE
(Counsel of Record)

ROBERT L. PARKS, ESQUIRE

PODHURST, ORSECK, PARKS, JOSEFSBERG,
EATON, MEADOW & OLIN, P.A.

800 City National Bank Building

25 West Flagler Street

Miami, Florida 33130

(305) 358-2800

Counsel for Amicus Curiae

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<i>Johnson v. United States</i> , 749 F.2d 1530 (11th Cir. 1985), approved on reh'g en banc, 779 F.2d 1492 (11th Cir. 1986), rev'd, 107 S. Ct. 2063, 95 L. Ed.2d 648 (1987)	1, 2, 3
<i>Mackey v. Maremont Corp.</i> , 350 Pa. Super. 415, 504 A.2d 908 (1986)	6
<i>McKay v. Rockwell International Corp.</i> , 704 F.2d 444 (9th Cir. 1983), cert. denied, 464 U.S. 1043 (1984)	2, 3, 5, 6, 7, 8
<i>Shaw v. Grumman Aerospace Corp.</i> , 778 F.2d 736 (11th Cir. 1985), cert. pending (case no 85-1529)	5, 8, 10
<i>Westfall v. Erwin</i> , 56 U.S.L.W. 4087 (Case No. 86-714; January 13, 1988)	1, 3, 4

Text

Kellman, <i>De-Coupling the Military/Industrial Complex—the Liability of Weapons Makers for Injuries to Servicemen</i> , 35 Clev. St. L. Rev. 351 (1987)	1
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CASE NO. 86-492

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IN SUPPORT OF PETITIONER**

Our purpose in filing this supplemental brief is to update our initial argument by bringing four recent relevant developments to the Court's attention: (1) this Court's decision in *United States v. Johnson*, 107 S. Ct. 2063, 95 L. Ed.2d 648 (1987); (2) this Court's decision in *Westfall v. Erwin*, 56 U.S.L.W. 4087 (Case No. 86-714; January 13, 1988); (3) the Florida Supreme Court's decision in *Dorse v. Armstrong World Industries, Inc.*, 513 So.2d 1265 (Fla. 1987); and (4) a recent law review article in which the issue is explored from a somewhat different perspective than it has previously been explored here: Kellman, *De-Coupling the Military/Industrial Complex—the Liability of Weapons Makers for Injuries to Servicemen*, 35 Clev. St. L. Rev. 351 (1987).

1. In our initial brief, we suggested that an affirmance by this Court of *Johnson v. United States*, 749 F.2d 1530 (11th Cir. 1985), *approved on reh'g en banc*, 779 F.2d 1492 (11th Cir. 1986), *rev'd*, 107 S. Ct. 2063, 95 L. Ed.2d 648 (1987), would amount to rejection of the foundation upon which the "government contractor defense" was constructed in *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984), and its progeny. Unfortunately, that affirmance was not forthcoming. However, four members of this Court dissented, opining that *Feres v. United States*, 340 U.S. 135 (1950), was wrongly decided—and stating that the *Feres* doctrine should at least not be extended beyond the core cases to which it had previously been applied. Since the defense in issue in the instant case amounts to an extension of the *Feres* doctrine to private independent contractors of the government (an extension which is *well* beyond the limits to which the defense was extended by the majority in *Johnson*), it would appear that at least four members of this Court have agreed with our initial contention—that the *Feres* doctrine provides no legitimate basis for immunizing the entire defense industry from traditional accountability in tort.

Of course, four votes are not enough. However, it is worth noting that the majority's opinion in *Johnson* also appears to reject the foundation upon which the different defense in issue here was constructed. As we noted in our initial brief, the *Feres* doctrine has been historically justified by this Court on essentially three grounds—the distinctively federal relationship of government and soldier, the availability of veterans' benefits, and the need to preserve military discipline. And, as we suggested in our initial brief, the *McKay* Court misread *Feres* in concluding that it was bottomed upon a

fourth ground—the notion that the United States should not bear the cost of accidents to its military personnel through provision for liability insurance or otherwise. The majority's opinion in *Johnson* reiterates the *three* reasons historically advanced in justification of the *Feres* doctrine, and nowhere even arguably hints at the existence of the fourth reason invented by the *McKay* Court. Therefore, notwithstanding that the *Feres* doctrine may have narrowly survived in *Johnson* in cases where the *government* is the tortfeasor, its survival provides no support for the further extension of the doctrine fashioned by the *McKay* Court and advocated here by the defense industry.

2. In a letter to the Court, the government has suggested that the Court's recent decision in *Westfall v. Erwin*, *supra*, may be relevant to the issue presented here. The Court held in that case that federal officials are immune from state tort law actions only where their challenged conduct is within the scope of their official duties and is discretionary in nature, and that they are not otherwise immune from suit for tortious conduct. We are uncertain as to how the government intends to advance the decision in support of immunity for the defense industry here, but if it means to suggest that defense contractors should be treated as federal officials and immunized from suit for their design decisions, we would submit two things in response: (1) private corporations operated for profit simply cannot be considered "agents" of the government merely because they occupy the status of "independent contractors" by virtue of their contracts with the government; and (2) this Court has held essentially that on repeated occasions. See the decisions cited at page 17, footnote 6, of our initial amicus brief.

Westfall does appear to be relevant to the issue presented here in another way, however, since it observes that the type of immunity sought by the defense industry here is generally disfavored in the law:

This Court always has recognized . . . that official immunity comes at a great cost. An injured party with an otherwise meritorious tort claim is denied compensation simply because he had the misfortune to be injured by a federal official. Moreover, absolute immunity contravenes the basic tenet that individuals be held accountable for their wrongful conduct. We therefore have held that absolute immunity for federal officials is justified only when "the contributions of immunity to effective government in particular contexts outweigh the perhaps recurring harm to individual citizens." [Citation omitted].

56 U.S.L.W. at 4088.

This Court also observed in *Westfall* "that Congress is in the best position to provide guidance for the complex and often highly empirical inquiry into whether absolute immunity is warranted in a particular context". *Id.* at 4089. We respectfully submit that both of those observations are peculiarly germane to the similar issue presented here, especially since (as we initially observed): (1) this nation has fought several wars (and maintained effective interim peacekeeping forces) for decades upon decades, without any previously-perceived need to immunize the defense industry from accountability in tort; and (2) Congress has consistently rejected the defense industry's supplications to relieve it from that traditional accountability.

3. When the issue presented here was recently presented to the Florida Supreme Court in *Dorse v. Arm-*

strong World Industries, Inc., supra, it was resolved by rejecting *McKay* and its progeny (which include the Fourth Circuit's decision in the instant case)—and by following the Eleventh Circuit's decision in *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985), *cert. pending* (case no. 85-1529). We have proposed that course as an alternative to the Court, in the event that it disagrees with us that no form of the defense should be recognized—and we therefore commend the reasoning of the Florida Supreme Court to this Court:

We are persuaded by the weight of authority, and conclude that a defense similar to that asserted by *Eagle-Picher*—a "military contractor's defense"—should be recognized under the law of this state. We do not find as some courts have suggested, that this defense arises from the doctrine of sovereign immunity. To the contrary, an entity or business acting as an independent contractor of the government, and not as a true agent, logically cannot share in the full panorama of the government's immunity. . . .

Rather, we agree with the Eleventh Circuit that the theoretical basis of this defense is the federal war-making and defense power, which the constitution has entrusted exclusively to the President and Congress. . . .

. . . .

On the other hand, decisions primarily within the discretion of a private independent contractor enjoy no such protection. We find this to be the crucial distinction between those instances in which the military contractor's defense may be asserted in Florida and those in which it may not. . . .

We are persuaded that the test established by the Eleventh Circuit in *Shaw* should be the test used in Florida for establishing a military contractor's defense in a products liability action:

A contractor may escape liability only if it affirmatively proves: (1) that it did not participate, or participated only minimally, in the design of those products or parts of products shown to be defective; or (2) that it timely warned the military of the risks of the design and notified it of alternative designs reasonably known by the contractor, and that the military, although forewarned, clearly authorized the contractor to proceed with the dangerous design.

Id.

To be able to assert this defense, then, an independent contractor affirmatively must show that the decision to confront or create a known material risk essentially was made by the military. As a corollary, the contractor must show compliance with the specifications material to the dispute at bar that were precisely prescribed and required by a contract between it and the government. If the specifications are not precise and leave the contractor with substantial discretion, then the contractor must shoulder strict liability to the extent its exercise of that discretion has caused an injury.

513 So.2d at 1268-69 (footnotes omitted).

A similar conclusion was reached in *Mackey v. Maremont Corp.*, 350 Pa. Super. 415, 504 A.2d 908, 915 (1986), in which the Court disagreed with the Third Circuit's adoption of the *McKay* defense, and limited the defense in Pennsylvania as follows:

The government contract defense has always only protected contractors carrying out the discretionary decisions of the government from the damages caused by the government's own planning or engineering decisions. If the engineering decisions were made by the contractor, or if the government made the decisions without the benefit of the contractor's technical knowledge, then the contractor should not be protected.

4. Finally, we commend Professor Kellman's recent scholarly analysis of the problem to the Court. His article is highly critical of *McKay* and its progeny, and argues that the *McKay* defense amounts to an altogether inappropriate and dangerous extension of sovereign immunity to private commercial interests. He urges that no "government contractor defense" should be recognized for the type of "negotiated contracts" at issue in the several cases presently before the Court, and that the defense should be limited to the "contract specifications defense" which had historically attached only to "advertised contracts", until the *McKay* Court broadened it to confer nearly absolute immunity upon the defense industry for all types of government contracts. To do otherwise, he argues, would be contrary to, and thereby badly undermine, the military's own present procurement policies, which seek to preserve traditional accountability for "negotiated contracts" as an economic incentive to provide the military with safely designed products.

Professor Kellman also argues that product design decisions made by contractors do not constitute the type of military policy which should not be subject to scrutiny by the judiciary, and he suggests alternatives for the protection of military policy less onerous than the *McKay*

defense—alternatives which would satisfy the “separation of powers” concerns of both the *McKay* Court and the *Shaw* Court, without removing the incentives to safety presently provided by traditional accountability for tortious conduct. For his conclusion, we will quote from a portion of his summary of the article, which he provided us for that purpose:

Many of the questions raised by the military contractor defense have been recently and explicitly addressed by Congress. Despite strenuous arguments identical to those made in support of the military contractor defense, weapons contractors failed to convince Congress to refrain from imposing warranties for weapons performance. Contractors for a weapons system must now guarantee in writing that the system and its components conform to performance standards and are free from all defects. In the event of a failure of that weapons system, the contractor must bear the cost of prompt repair or replacement or reimburse the United States for such costs. “The purposes of a warranty in a government contract is to delineate the rights and obligations of the contractor and the government for defective items and services and to foster quality performance.” (Armed Services Procurement Regulation 1-324).

Congress has chosen not to protect military contractors from product liability for defective design and manufacturing. Warranties are a recognized means to hold producers of goods accountable to the users of those goods for losses resulting from defective design or workmanship. To require them of military contractors, despite the objections of those contractors, signifies a profound congressional commitment

to subject military procurement to the laws of the commercial marketplace. Ironically, having lost in Congress, the objections to accountability have been accorded a more sympathetic judicial reception. It must be asked by what authority the judiciary may enact immunities regarding weapons procurement which Congress, constitutionally vested with the authority to determine national security policy, has chosen to reject.

As the last forty years have witnessed the growth of the most powerful military establishment assembled by humankind, there has been the corresponding onus to use that power in the pursuit of policy constitutionally decided. Military strength has been sought, but not militarism. A private source of weapons production has developed, but privatization of weapons policy is eschewed.

In a democracy, there should be resistance to the possibility that weapons makers are intimately involved in establishing this nation’s military policy. There exists some historical apprehension that, if empowered, private weapons makers might initiate and propel military acquisitions in order to advance their pecuniary interests. If it were true, it would be a grievous fault. True or false, it is a possibility which must not receive judicial imprimatur.

The judiciary should hold weapons makers legally accountable to the same degree as any private market participant. If immunities are to be granted to military contractors, Congress should be the grantor. Judicial deference is appropriate only for controversies demonstrably falling into the sphere of policy-making. The judiciary’s role must be to define the

line of demarcation separating military policy determined by proper authorities from the production of weapons by commercial interests.

If corporate weapons makers are extended an immunity from accountability because of the judiciary's misconception that weapons makers can and should guide military policy, then legal control over the most critical matters of national governance is jeopardized. The Supreme Court should reverse *McKay* and *Boyle, et al.* and require the lower courts to allocate responsibility for defective weapons on a case by case basis.

We respectfully submit once again that the Court should not immunize the defense industry from accountability in tort by mandating what Congress has rejected, in the form of a "government contractor defense". Alternatively, if a defense is to be recognized, it should be narrowly drawn along the lines drawn in *Shaw*—to preserve accountability for design decisions made by contractors, and preclude judicial inquiry only where design decisions are truly made by the military as a matter of military policy.

Respectfully submitted,

JOEL D. EATON, ESQUIRE

(Counsel of Record)

ROBERT L. PARKS, ESQUIRE

PODHURST, ORSECK, PARKS, JOSEFSBERG,
EATON, MEADOW & OLIN, P.A.

800 City National Bank Building
25 West Flagler Street
Miami, Florida 33130
(305) 358-2800

Counsel for Amicus Curiae

SUPPLEMENTAL BRIEF

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CLERK

In The
Supreme Court of the United States
October Term, 1986

DELBERT BOYLE, personal representative of the Heirs
and Estate of David A. Boyle, deceased,

Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

On Writ Of Certiorari To The United States
Court Of Appeals For The Fourth Circuit

SUPPLEMENTAL BRIEF FOR PETITIONER

LOUIS S. FRANECKE, Esq.

JOHN O. MACK, Esq.

MACK, HAZLEWOOD,

FRANECKE & TINNEY

221 Pine Street, Suite 600

San Francisco, CA 94104

415/391-1560

MICHAEL MOORE, Esq.

CARTWRIGHT, SUCHERMAN

& SLOBODIN, INC.

101 California Street, 26th Floor

San Francisco, CA 94111

415/433-0440

Counsel for Petitioner

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I.

INTRODUCTION

Petitioner respectfully requests that this Court consider Petitioner's Opening and Reply Brief with this Supplemental Brief as a full presentation.

There are multiple combinations of issues presented, not the least of which is that Petitioner contends and requests reinstatement of the jury's verdict.

By necessity, Petitioner is also forced to address the issue of the "Government Contractor Defense" which is before this Court for the first time and which has many facets.

Petitioner does not concede the importance of the other issues to the Government Contractor Defense.

II.

**THE GOVERNMENT CONTRACTOR DEFENSE IS
A PURE INVENTION OF THE COURTS AND
RESTS ON NO STATUTORY AUTHORITY**

A. THE CONTRACT SPECIFICATION DEFENSE

The origin of the Government Contractor Defense is clearly distinguishable from that of the Contract Specification Defense.

The Contract Specification Defense rests on negligence principles, and provides that a contractor is not liable for damages resulting from conformance to specific specifications provided by another unless:

- (1) the contractor was negligent in performing the work or

- (2) those specifications were so obviously defective and dangerous that a contractor of reasonable prudence would be put on notice that the product was dangerous and likely to cause injury. *Challoner v. Day and Zimmerman, Inc.* (1975), (CA 5 Tex.) 512 F.2d 77, Vacated on other grounds 423 U.S. 3, on remand (CA 5 Tex.) 546 F.2d 26; *Bynum v. FMC Corporation* (1985), (CA 5 Miss.) 770 F.2d 556.

This defense is based on the presumption that a contractor will lack the expertise to evaluate the specifications given to it and is thus not held to the same high standard of care as is a designer. *Johnston v. United States* (1983), (D.C. Kan.) 560 F. Supp. 351; *Ryan v. Feeney and Sheehan Building Company* (1924) 239 N.Y. 43, 145 N.E. 321.

Thus, in 1940 in *Yearsley v. W.A. Ross Construction Co.*, 309 U.S. 18, this Court held that a Corp of Engineers contractor was not liable for diverting the course of the Missouri River so long as the diversion was within the scope of the contractor's authority. No liability on the contractor was found for the subsequent damage done by the river.¹

However, even under the Contract Specification Defense, there is a limit to the lower standard of care required of the obedient contractor. In *Pearson v. Could-*

¹Subsequent decisions involving allegations of negligence in the performance of a service for the government have reinforced this defense. *Meyers v. United States*, 323 F.2d 580 (9th Cir. 1963) work on a federal highway in conformity with the terms of the contract was not subject to liability; and *Dolphin Gardens, Inc. v. United States*, 243 F. Supp. 824 (D. Conn. 1964) authority to dredge a channel insulated the contractor, who had complied with the contract requirements, from liability.

well-Wingate Co., 187 F.2d 832 (2nd Cir. 1951), cert. denied 341 U.S. 936 (1951) Judge Learned Hand held that the trial court correctly instructed the jury that one contractor was liable for defects in the specifications which would have been obvious to an electrical engineer since the contractor employed an electrical engineer, but another contractor was held to a lower standard since he had no engineer in his employ. Thus, the inquiry under the Contract Specification Defense is whether the design defects *should have been* obvious to the contractor in light of the contractor's expertise.

Thus, where the contractor is negligent in not having perceived an obvious defect or one within the state-of-the-art, then the Contract Specification Defense has always been forfeited.

B. THE EMERGENCE OF THE GOVERNMENT CONTRACTOR DEFENSE DEFIES PROPER EXERCISE OF SOVEREIGN IMMUNITY

Now, before this Court, the Government Contractor Defense, unlike the Contract Specification Defense, attempts to uniquely grant to the contractor a share of the government sovereign immunity.

A contract of manufacture and design with any entity other than the United States is already covered by existing law.

A defense should not be created by the Federal judiciary unless the subject matter of the defense is a matter of Federal Common Law or unless specifically authorized by Federal Statute. *Minnesota v. United States*, 59 S.Ct. 292, 309 U.S. 382 (1939). The Government Contractor De-

fense is not a matter of Federal common law, it is not founded on statute and the judiciary should not justify it as an extension of sovereign immunity. It is purely an invention of the lower Federal Courts.

Twenty years ago, the judiciary recognized no defense for manufacturers claiming to be the alter ego of the military. In *Whittaker v. Harvell-Kilgore Corp.*, 418 F.2d 1010 (5th Cir. 1969) the maker of a hand grenade that prematurely exploded injuring plaintiff was held liable despite the fact that it was operating a government-owned plant, using material supplied by the government, and that the contract provided for indemnification by the government for losses. These facts did not, however, justify granting sovereign immunity to the defendant simply because it occupied a "near symbiotic relationship with the military." In accord was *Foster v. Day and Zimmerman*, 502 F.2d 867 (8th Cir. 1974) ("the doctrine of sovereign immunity may not be extended to cover the fault of a private corporation").

Cleverly, the lower courts based the difference between the specific Contract Specification Defense and the Government Contractor Defense on the burden of proving the governmental compulsion.

Thus, the cases have focused on the question of whether this defense, based on sovereign immunity, will stand if the military "choose" or "approve" rather than *order* the design subsequently alleged to be defective. See *Koutsoubas v. Boeing Company*, 755 F.2d 352 (3rd Cir. 1985).

These lines of cases start with the *Agent Orange* case, 534 F. Supp. 1046 (E.D. N.Y. 1982) cert. denied sub nom

104 S.Ct. 1417 (1984) which litigation bears witness to Justice Holmes' admonition that hard cases make bad law. While the litigation was with regard to injured servicemen from Vietnam being toxically injured by the "Agent Orange" herbicide, the court stated that a Government Contractor Defense could be invoked if defendants proved (1) the government established the specifications for the product, (2) the product complied with the government's specifications in all material respects; and (3) the government knew as much or more than the defendants did about the hazards that accompanied the use of the product.

Of critical importance was the mere requirement of knowledge by the government and the addition of "specifications established by the government" for the compulsion requirement previously demanded by the Contractor Specification Defense cases. Thus clearly putting the responsibility on the government (sovereign immunity) regardless of any knowledge, participation or expertise of the contractor.

Thereafter the litany of cases in the lower courts interpreting specifications established by the government and compulsion have led us to the present case.

It should be clear that by taking this drastic step of insulating the contractor, the judiciary will step far beyond legislative intent regarding the bounds of sovereign immunity.

III.

**CONGRESS WOULD NOT SANCTION AND
DOES NOT SANCTION THE GOVERNMENT
CONTRACTOR DEFENSE**

While the necessity of a private weapons industry has long been undeniable,² that necessity is not a justification for denying the accountability of these manufacturers for the weaponry they produce.

It is curious, that in all of the previous cases, including the *Boyle* case here, *not one military officer* has testified that the particular product alleged to be defective was designed by the military, that the defense was needed for a military mission or that an award to the plaintiffs would result in an erosion of military discipline. This necessary ingredient to verify, factually, any implications of a defect causing such an effect has been absent in every case.

Nor is there likely to be. By illustration, Brigadier General Weiss before the Senate Arms Services Committee:

"Ultimate responsibility for product quality and the assurance of the given company's product conforms to contractual specifications and the statements of the work, rests with the prime contractor. The government's role is to assure that the contractor's quality system is working and is reliable through period system checks, audits and selected physical inspection of the products on a pre-planned and random basis. . . ."

²See, hearings to increase the efficiency of the military establishment of the United States, before the House Committee on Military Affairs, 64th Congress, First Session 498 (1916).

The contractor is responsible for the quality of its product. His responsibilities start with the product's design, carries through product viability reviews and culminates in the manufacturing process.

The government's responsibility is to make sure that the contractor's system is functioning through system checks, and random and selected mandatory inspections and tests of products."³

Of no less importance is that Congress has encouraged the private enterprise system of weapons procurement in the United States which has afforded a large opportunity for personal and economic success in order to provide incentives for efficient and innovative production.

In 1985, the Department of Defense placed contracts worth approximately 164 billion dollars, 70% of which went to the top 100 contractors.⁴ The beneficiaries now claiming the Government Contractor Defense seek to have it both ways: the pecuniary benefits of the free market with the legal privileges of being part of the military establishment.

Congress also has enacted in the Competition in Contracting Act (Title VII of the Deficit Reduction Act of 1984, included in P.L. 98-369, 98 Stat. 494 and codified at 31 U.S.C. Sections 3551-3556), where Congress has sought a

³Task force and Selected Defense Procurement Matters: Hearing before the Senate Armed Services Committee, 98th Congress, 2nd Session 11-12 (1984). See statement of Brigadier General Bernard L. Weiss, Director, Contracting and Manufacturing Policy, Headquarters, United States Air Force).

⁴Conduct and accountability, a report to the President by the President's Blue Ribbon Commission on Defense Management, page one (June, 1986).

procurement system which encourages weapons acquisition through competition.

Congress has, through the Department of Defense, drawn distinctions between "performance specifications" and "design specifications".

Contracts involving an explicit government mandated design specification leaving only actual construction to the contractor are formally advertised to one and all on a competitive basis. Design specifications have been characterized as including "precise measurements, on tolerances, materials, in process and finished product tests, quality control and inspection requirements, and other information."⁵

However, not even a Specification Contract entitles a contractor to rely solely on the drawings and specifications provided nor does the labeling of a contract as containing design specifications remove a contractor's obligation for the extent of the work to be accomplished. *Zinger Construction Co., Inc. v. United States*, 807 F.2d 979 (5th Cir. 1986).

On the other hand, the "Performance Specification Contracts" tend to entail primarily performance specifications merely indicating what characteristics the government requires in the item. "Where an item is purchased by a performance specification, the contractor accepts gen-

⁵*Appeal of Aerodex, Inc.*, ASBCA 7121, 1962 BCA 3492 (1962).

eral responsibility for design, engineering and achievement of stated performance requirements."⁶

Negotiated contracts contain only performance specifications and leave design of the weapon systems to the expertise and discretion of the manufacturer. "In a performance contract, the contractor must assume responsibility for the means and methods selected to achieve the end result." *Penguin Industries, Inc. v. United States*, 530 F.2d 934, at 937 (Ct. Cl. 1976).

Mere "approval" of the design by the government does not consequently eliminate that responsibility.

The recent testimony of Deputy Secretary of Defense, William H. Taft, IV explains the rationale:

"The quality and productivity of a weapon system is enhanced when we focus our efforts on its critical requirements. In the past, our request for proposals contained thousands of detailed military specifications. These specifications described how contractors were to accomplish specific tasks, allowing little flexibility for contractors to assess and recommend those requirements which were truly needed and cost effective. Under our new "streamlining" initiative, we are telling contractors what is required rather than how to accomplish it."⁷

Thus, a deliberate policy choice has been made by our senior military officials to award contracts for major weap-

⁶*Appeal of Aerodex, Inc.*, supra.

⁷Citing hearings, Defense Acquisition Process, Policies, and Instructions, before the House Committee on Armed Services, procurement and military, nuclear system sub-committee, 98th Congress, 2nd Session (statement of Deputy Secretary of Defense, William H. Taft, page 1579/80 (1985)).

ons programs entailing significant design tasks through negotiation because the government wants to evaluate contractors' technical capabilities, technical approaches, and management abilities as well as cost.

This point is critical to the Government Contractor Defense. Congress, through the Department of Defense, has formalized the fundamental difference between the acquisition of relatively fungible commodities as to which it can specify design requirements from the acquisition of sophisticated weapon systems as to which it intentionally assigns design responsibility to the manufacturer.

In such a situation, the acceptance by the military of a particular design choice does not allay the responsibility that the design itself was the choice of the manufacturer in the first instance.

For this Court now, without benefit of a "clear" indication from Congress, to adopt a Government Contractor Defense will undermine where Congress has been placing the responsibility for many years.

Petitioners have cited in their Reply Brief other examples of Congressional intent to not immunize government contractors from responsibility for their designs.

IV.

THE DISCRETIONARY FUNCTION EXCEPTION TO THE FEDERAL TORT CLAIMS ACT HAS NO APPLICATION TO THE GOVERNMENT CONTRACTOR DEFENSE

It is implied by some that "a design acceptance" by a government engineer should in some way operate as a

defense to a government contractor or an exercise of the discretion exception under the Federal Tort Claims Act.

This case is one in which the government is not a party. Therefore, the Federal Tort Claims Act has no direct application.

Congress has had ample opportunity to enact a Government Contractor Defense, or if you will, an extension of sovereign immunity to government contractors. Congress has declined. Congress likewise has declined to indemnify government contractors in products liability cases.

The extension of sovereign immunity cannot be accomplished by the Courts. Extension of sovereign immunity like the consent to be sued can only come from Congress, by express statute. *Minnesota v. United States*, 59 S. Ct. 292, 309 U.S. 382 (1939). Petitioner contends that extension of immunity in this context is beyond Congressional intent and this Court's prior decisions.

This Court has recognized the difference between what is meant by "discretion" versus an unlimited freedom to perform any act whatsoever.

In *United States v. Varig Airlines* (1984) 467 U.S. 797, this Court examined the questions of the Federal Aviation Administration's regulations regarding inspection, servicing and overhaul of a Boeing 707 commercial jet aircraft which had an onboard fire that resulted in the death of the passengers.

This Court held that the FAA's implementation of a mechanism for compliance review of a type certificate of a Boeing 707 is plainly discretionary activity of the "nature and quality" protected by § 2680(a). There, the FAA

had determined that a program of "spot checking" manufacturers compliance with minimum safety standards best accommodated the goal of air transport safety and the reality of the finite agency resources. Judicial intervention in such decision making through private tort suits would require the courts to "second guess" the political, social, and economic judgments of an agency exercising its regulatory function.

Boeing, on the other hand, was held responsible regardless of the exercise of the "discretionary" function of the government.

In other words, when dealing with the Government Contractor Defense, should the government engineers' "approval" or their preparation of "product requirements specifications" be construed as a discretionary exception? Petitioner thinks not.

Regardless of the interpretations of the discretionary function, it has still continuously and clearly been held that while policy making may be excluded, *negligent execution of that policy* is not discretionary but in fact exactly what it sounds like, "negligence." In other words, a horse of a different color is still a horse. See *Eastern Airlines, Inc. v. Union Trust Company*, 95 U.S.App.D.C. 189, 221 F.2d 62, summarily affirmed sub nom *United States v. Union Trust Company*, 350 U.S. 907 (1955); *Indian Towing Company v. United States*, 350 U.S. 61 (1955).

When a government engineer is given a design choice to "approve", approval does not eliminate the defect. The exercise of discretion was performed by the designer, not by the government "approval". The government engineer did not design the product, but merely accepted it as

being what it was presented as being, i.e. a product suitable for its intended purpose supposedly without defect.

It should be noted that only if the defense is put in place is it necessary to "second guess" military decisions by establishing whether or not the military in fact wanted a particular design allegedly defective and what its actual knowledge of the defect really was during the design process, the evaluation process, the testing process and later during its implementation in the military system.

See also *West v. Federal Aviation Administration*, 87 C.D.O.S. 4398 (9th Cir., 1987).

V.

RESPONDENTS WAIVED A JURY INSTRUCTION ON THE GOVERNMENT CONTRACTOR DEFENSE AT THE TRIAL LEVEL

Petitioner and Respondents had specifically stipulated that this case was to be tried under Virginia law (JA 78-79).

Virginia had not nor to the present date has it adopted the government contractor defense as the law of Virginia.

Similarly, the Fourth Circuit had not adopted the Government Contractor Defense, in any form, until the *Tozer v. LTV Corporation*, 792 F.2d 403 (4th Cir. 1986) case decided in companion with the present *Boyle* case in 1986.

Therefore, the jury instruction on the Government Contractor Defense in this case was improperly given, and is in fact not applicable with regard to the jury's determinations at the trial court level nor here before this Court.

See also a similar case tried in Texas under Texas law wherein the Federal Circuit Court refused to adopt the Government Contractor Defense. *Hansen v. Johns-Manville Products Corp.*, (1984), (CA 5 Tex.) 734 F.2d 1036 cert. denied 470 U.S. 1051 (applying Texas law).

VI.

JUDICIAL FORMULATION OF A GOVERNMENT CONTRACTOR DEFENSE WILL BE EXTREMELY DIFFICULT AND WILL PROMOTE ENDLESS FURTHER LITIGATION

It is clear from the briefs filed by the parties and many amici, that there is tremendous controversy and confusion among the circuits as to what form a Government Contractor Defense could take.

Even in the previous oral argument, Donald Ayers, Deputy Solicitor General, suggested another version of the defense that would protect high technology development projects but not be applicable to the more common or commercial products purchased by the government.

Even this interpretation creates quite a dilemma.

1. In order that an independent contractor affirmatively show that the decision to confront and create a known material risk was essentially made by the military, military testimony is going to be required. The military will be subpoenaed and deposed and brought into court to testify as to whether or not they were specifically aware of what the actual material risk was and that they knowingly accepted it.

2. Whether the goods or services are of a commercial and non-military nature will have to be determined. One

offered criteria was whether or not same or substantially similar goods were produced for sale to non-military buyers. Value judgments will have to be made by the court as to whether or not the product was first sold to the military and then to the public or to the public and then to the military and are they substantially similar or not.

3. Finally, proof will be needed of timely warnings by the defendant of every reasonably known material risk inherent in the proposed specifications. While this is not necessarily a bad idea, it is merely the "Contract Specification Defense" which is already in place.

Yet all of the different formulations by the various circuits really do not accomplish what Congress and the military have been doing for many years.

If the military desires a product, they can negotiate a contract for one in what is an arm's length transaction. If the military and Congress wish to immunize or protect that contractor from liability, Congress or the military can do so by legislation or a specific provision in the negotiated contract. So far neither has chosen to do so.

—————o—————

VII.

CONCLUSION

Respondent asks for reinstatement of the jury verdict, or in the alternative, remand for further proceedings in accordance with this Court's decisions.

Respectfully submitted,

LOUIS S. FRANECKE, Esq.

JOHN O. MACK, Esq.

MACK, HAZLEWOOD,

FRANECKE & TINNEY

221 Pine Street, Suite 600

San Francisco, CA 94104

415/391-1560

MICHAEL MOORE, Esq.

CARTWRIGHT, SUCHERMAN

& SLOBODIN, INC.

101 California Street, 26th Floor

San Francisco, CA 94111

415/433-0440

Counsel for Petitioner

SUPPLEMENTAL BRIEF

No. 86-492

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In the Supreme Court of the United States

OCTOBER TERM, 1987

DELBERT BOYLE, PERSONAL REPRESENTATIVE OF THE HEIRS
AND ESTATE OF DAVID A. BOYLE, DECEASED, PETITIONER

v.

UNITED TECHNOLOGIES CORPORATION

*ON WRIT OF CERTIORARI TO THE
UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT*

**SUPPLEMENTAL MEMORANDUM FOR THE
UNITED STATES AS AMICUS CURIAE**

CHARLES FRIED
*Solicitor General
Department of Justice
Washington, D.C. 20530
(202) 633-2217*

11/2/82

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Although the opening brief in this case addressed primarily the shape that the military contractor defense should take, the first oral argument focused on whether the defense should be recognized by this Court as a matter of federal common law. As noted in our opening brief (at 11-12), the uniquely federal interests involved in the design of military products and the disruptive effects on the national defense of tort suits alleging that such products were defectively designed justify recognition of the military contractor defense as a matter of federal common law. This Court's decision in *Westfall v. Erwin*, No. 86-714 (Jan. 13, 1988), slip op. 3 (quoting *Howard v. Lyons*, 360 U.S. 593, 597 (1959)), in which the Court held that "the scope of absolute official immunity afforded federal employees is a matter of federal law, 'to be formulated by

the courts in the absence of legislative action by Congress,' " bolsters that conclusion.

This Court has made clear that there are two steps in determining whether a particular rule should be recognized as a matter of federal common law. First, it is necessary to decide whether the applicable legal rule is to be determined as a matter of federal or state law. "When Government activities 'aris[e] from and bea[r] heavily upon a federal . . . program,' the Constitution and Acts of Congress 'require' otherwise than that state law govern of its own force.' " *United States v. Kimbell Foods, Inc.*, 440 U.S. 715, 726-727 (1979) (citation omitted). Second, assuming that the issue is properly governed by federal law, it is necessary to determine whether a specific uniform national rule is appropriate or whether, as a matter of federal law, the various rules of state law should be allowed to govern. In making this determination, the Court has considered the purposes to be served by the proposed uniform national rule, the adverse consequences resulting from the application of the various state law rules, and the disruptive consequences of supplanting the state law rules. *E.g.*, *id.* at 730-733; *Banco Nacional de Cuba v. Sabbatino*, 376 U.S. 398, 432-433 (1964).

Also, the Court has sometimes been attentive to inferences from legislative action or inaction to the effect that Congress has indicated its disapproval of a proposed uniform common law rule. *Texas Industries, Inc. v. Radcliff Materials Inc.*, 451 U.S. 630, 645 (1981); *United States v. Standard Oil Co.*, 332 U.S. 301, 315 (1947). Absent such a reasonable inference, however, where this Court has concluded that a uniform national rule is indicated as a matter of federal interest, it has fashioned the rule.

1. The intimate connection between the potential product liability of military contractors and the ability of the United States Government to procure the highly specialized weapons systems that it must have for the national defense strongly support the conclusion that federal law must govern. As we indicated in our opening brief (at 12-17), the application to military weapons producers of ordinary state law tort liability rules would discourage those manufacturers from providing necessary assistance in the product design and development process, would undermine military discipline by authorizing the second-guessing of weapons design and procurement decisions, and would increase the manufacturer's uncertainty as to potential liability, thus increasing the costs to the United States as well.

The relationship between the government and its soldiers is "distinctively federal," and its "scope, nature, legal incidents and consequences * * * are fundamentally derived from federal sources and governed by federal authority" (*Standard Oil Co.*, 332 U.S. at 305-306). No less distinctively federal is the relationship between the government and its suppliers of ordnance. *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666, 672 (1977).¹ Tort suits alleging that military products were

¹ As the Fifth Circuit stated in *Bynum v. FMC Corp.*, 770 F.2d 556, 569 (1985), it is difficult to think of an area that is more uniquely of federal concern since "[t]he composition, training, equipping, and management of our military forces is a matter exclusively within the rights and duties of the federal government and * * * any interference with the federal authority over national defense and military affairs implicates uniquely federal interests of the most basic sort."

Unlike the Fifth Circuit, the Third Circuit in *Brown v. Caterpillar Tractor Co.*, 696 F.2d 246 (1982), concluded that a military contractor defense did not need to be formulated as a matter of federal common law (although it recognized the defense as a matter of Pennsylvania law). The Fifth Circuit correctly concluded (770 F.2d at 570 n.17 (quoting 696 F.2d at 249)) that the Third Circuit erred by stating that

defectively designed greatly impair the ability of the government to enlist effectively the assistance of private contractors in developing and producing weapons systems required for the national defense, since such liability arises from participation in the design process. It is thus plain that "the authority and duties of the United States as sovereign are intimately involved" (*Texas Industries, Inc.*, 451 U.S. at 641) in the issue of contractor liability, and that this case falls with those where the Court has found the governing law to be federal. *Kimbell Foods, Inc.*, 440 U.S. at 726; *Sabbatino*, 376 U.S. at 427; *Standard Oil Co.*, 332 U.S. at 305; *Clearfield Trust Co. v. United States*, 318 U.S. 363, 366 (1943).

2. For the same reasons that federal law must govern the duties of military contractors arising from the development and production of weapons, a uniform military contractor defense—as is set forth in our opening brief (at 17-19)—should be recognized. The government's ability effectively to enlist the assistance of private contractors in the product development process and to acquire effective weapons systems at reasonable cost and in an expeditious manner would be substantially impaired if such a defense is not recognized.² This case therefore presents just the

suits brought against military contractors "generally do not necessitate the second-guessing of military decisions." As the Fourth Circuit concluded in *Tozer v. LTV Corp.*, 792 F.2d 403 406 (1986), "it is nearly impossible to contend that the contractor defectively designed a piece of equipment without actively criticizing a military decision."

² It may be answered that the United States can induce contractors to continue to provide product design consultation and assistance by agreeing to indemnify them for all liability to which they are exposed as a result of their role in developing the product. While that may be true, it offers no realistic alternative. The United States is itself generally immune under the discretionary function exception of the Federal Tort Claims Act, 28 U.S.C. 2680(a), from liability for its own

sort of "significant conflict" between "federal policy or interest and the use of state law" that justifies the formulation of a federal common law rule. *Wallis v. Pan American Petroleum Corp.*, 384 U.S. 63, 68 (1966). Indeed, a more striking conflict between a critically important federal interest and the consequences of otherwise applicable state law can not be found among the decisions of this Court invoking uniform federal common law rules.

The decisions of this Court declining to recognize federal common law rules themselves confirm that the military contractor defense should be recognized as a matter of federal common law. In *Kimbell Foods*, for example, while recognizing that federal law governs, the Court declined to substitute a nationwide federal rule for the existing body of state law relating to the priority of liens arising from federal loans. The Court reached that conclusion after noting the minimally disruptive effect of existing state law on the government's lending practices (440 U.S. at 730-737) and balancing it against the disruption that would result from the formulation of separate federal rules to operate against the backdrop of existing state commercial law (*id.* at 739). The adverse consequences on defense procurement resulting from the application of state tort law in the present context are plainly of far more substantial proportions.

In *Miree v. DeKalb County*, 433 U.S. 25 (1977), this Court declined to override state law allowing survivors of

weapons design decisions, and it would incur a substantial new liability if it were to agree to pay all judgments against contractors arising from challenges to the designs of weapons systems. Since Congress has determined that the United States should not be liable for injuries caused by design defects of military products, the United States should not be forced to assume liability simply because it seeks the assistance of private entities in performing its governmental obligations.

persons killed in a plane crash to sue as third party beneficiaries of a contract between the County and the Federal Aviation Administration, under which the County agreed to restrict activities adjacent to its airport to purposes compatible with normal airport operations. The Court reasoned (*id.* at 31) that "[t]he question of whether petitioners may sue respondent does not require decision under federal common law since the litigation is among private parties and no substantial rights or duties of the United States hinge on its outcome." In the present case, the United States will be substantially and adversely impacted by application of state tort law to the activities of military contractors. It can not be said here, as it was in *Miree* (*id.* at 32-33 (citation omitted)), that "any federal interest in the outcome of the question before us" is " 'too speculative' " or " 'too remote' " to justify application of federal law.

Similarly, in *Wallis* the Court relied on the absence of any significant threat to an identifiable federal policy or interest and declined to substitute a federal rule for Louisiana law relating to the enforcement of contracts transferring rights under federal mineral leasing contracts. The Court found no incompatibility between the application of state law and any federal policy or interest, and on that account upheld the application of state law without even considering the strength of the state interest in having its own rules govern. 384 U.S. at 68.³

³ Furthermore, while the disruption of state policies is a factor to be considered in determining whether federal common law should be applied, it appears that no major disruption would occur here since "a clear majority of courts that have considered the availability of the government contractor defense under applicable state law have decided to adopt the defense." *Bynum* 770 F.2d at 571, citing *Tillett v. J.I. Case Co.*, 756 F.2d 591, 599-600 (7th Cir. 1985) (Wisconsin); *Brown v. Caterpillar Tractor Co.*, 696 F.2d 246 (3d Cir. 1982) (Pennsylvania); *Hunt v. Blasius*, 55 Ill. App. 3d 14, 370 N.E.2d 617

3. This is not a situation where Congress, by action or inaction, has indicated a preference against the judicial formulation of a military contractor defense. See *Texas Industries, Inc.*, 451 U.S. at 645 ("[t]here is nothing in the statute itself, in its legislative history, or in the overall regulatory scheme to suggest that Congress intended courts to have the power to alter or supplement the remedies enacted"); *Standard Oil Co.*, 332 U.S. at 315 ("the situation is not new, at any rate not so new that Congress can be presumed not to have known of it or to have acted in the light of that knowledge"). Suits against manufacturers of military products were unknown until very recently since, as amicus Association of Trial Lawyers of America pointed out (Br. 9-10), there was no basis for such suits in state law until the 1960s. In response to the revolution in products liability law, the courts immediately formulated the military contractor defense. While there has been some variation in the nature of the defense recognized, no court has refused to recognize the defense altogether, and the majority of courts have followed the approach enunciated in *McKay v. Rockwell International Corp.*, 704 F.2d 444, 449, 451 (9th Cir. 1983), cert. denied, 464 U.S. 1043 (1984). Thus, Congress's inaction here cannot be presumed to indicate that it does not favor the defense. Rather, if any conclusion may be drawn from Congress's silence, it is that it approves of the defense as fashioned by the court in *McKay*.⁴

(1977); *Sanner v. Ford Motor Co.*, 144 N.J. Super. 1, 7-9, 364 A.2d 43, 46-47 (1976), aff'd, 154 N.J. Super. 407, 408-410, 381 A.2d 805, 806 (1977); *Casabianca v. Casabianca*, 104 Misc. 2d 348, 350, 428 N.Y.S.2d 400, 402 (Sup. Ct. 1980).

⁴ Congress recently has considered but not passed bills that would provide relief to military contractors. Its failure to enact those bills cannot be read as opposition to the military contractor defense as it

The issue presented here has a close parallel in this Court's many cases recognizing an immunity from state law liability for another class of defendants sued on account of actions taken at the behest of the United States—federal employees. In *Howard v. Lyons*, for example, the Court concluded that "the extent of the privilege in respect of civil liability for statements allegedly defamatory under state law which may be claimed by officers of the Federal Government" was plainly a matter of "peculiarly federal concern" that could not be left to determination under "the vagaries of the laws of the several States" (360 U.S. at 597). More recently, in *Westfall v. Erwin*, *supra*, this Court, while restricting the types of conduct to which the immunity applies, recognized the continued vitality of the federal common law defense to be applied in cases alleging that federal employees were negligent under state-law standards. The Court there recognized that "when officials exercise decisionmaking discretion * * * potential liability may shackle 'the fearless, vigorous, and effective administration of policies of government.'" Slip op. 4-5 (quoting *Barr v. Matteo*, 360 U.S. 564, 571 (1959)). The Court noted that "Congress is in the best position to provide guidance for the complex and often highly empirical inquiry into whether absolute immunity is warranted in a particular context," so that

has been formulated by the majority of the lower courts. The bills have differed from the military contractor defense as enunciated in *McKay* in that indemnification has been proposed for negligent contractors and other provisions have been proposed that would create incentives for contractors not to participate in the design process. As stated in our opening brief (at 21-22 n.21), the Justice Department opposed the bills on account of those problems. By failing to enact legislation, Congress, presumably aware that most of the federal courts have adopted the *McKay* version of the defense, has left matters in the hands of the federal courts.

"[l]egislated standards governing the immunity of federal employees involved in state-law tort actions would be useful" (*Westfall v. Erwin*, slip op. 8). But, while asking Congress for assistance, the Court nevertheless made clear that the defense continues to exist as a matter of federal common law.

A similar approach is warranted here. As indicated by the unanimous view of the lower courts that a military contractor defense should be recognized, potential contractor tort liability would interfere with the efficient procurement of military products, just as potential tort liability on the part of federal employees would interfere with the efficient administration of government. While legislated standards might be useful, in light of the adoption of the *McKay* test by the majority the courts of appeals there is no basis to infer from congressional inaction any disapproval of the defense.

Respectfully submitted.

CHARLES FRIED
Solicitor General

APRIL 1988

SUPPLEMENTAL BRIEF

(6)
No. 86-492

In the Supreme Court of the United States

October Term, 1986

DELBERT BOYLE, Personal Representative of the
Heirs and Estate of DAVID A. BOYLE, Deceased,

Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

ON WRIT OF CERTIORARI TO THE
UNITED STATES COURT OF APPEALS
FOR THE FOURTH CIRCUIT

SUPPLEMENTAL BRIEF AMICUS CURIAE OF BELL HELICOPTER TEXTRON, INC., IN SUPPORT OF RESPONDENT

R. DAVID BROILES*
BROWN, HERMAN, SCOTT
DEAN & MILES

Suite 203

Fort Worth Club Building

Fort Worth, Texas 76102

Telephone: (817) 332-1391

GEORGE GALERSTEIN

JAMES W. HUNT

Attorneys for
BELL HELICOPTER TEXTRON, INC.

*Counsel of Record

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No. 86-492

**In the Supreme Court of the
United States**

October Term, 1986

DELBERT BOYLE, Personal Representative of the
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Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,
Respondent.

**SUPPLEMENTAL BRIEF AMICUS CURIAE OF
BELL HELICOPTER TEXTRON, INC., IN
SUPPORT OF RESPONDENT**

ISSUES PRESENTED

Bell Helicopter Textron, Inc., files this supplemental brief amicus curiae in support of Respondent, United Technologies Corporation. This brief responds to two questions raised by the Court during oral argument on October 13, 1987:

- 1) What is the source of law of the Military Contractor Defense?

- 2) Should this Court act on the issue of the Military Contractor Defense?

SUMMARY OF ARGUMENT

The source of law for the Military Contractor Defense is derived from the United States Constitution, from federal statutes and regulations, and procurement contracts thereunder. The obligation of a military contractor to manufacture a product pursuant to detail specifications in the procurement contract exempts the contractor from civil tort liability which otherwise might be imposed under state or federal consumer tort law. It is the Court's constitutional role to resolve conflicting obligations between federal procurement contract law and consumer tort law.

ARGUMENT

I.

WHAT IS THE SOURCE OF LAW OF THE MILITARY CONTRACTOR DEFENSE?

The Court has inquired as to the source of law of the Military Contractor Defense. The question the Court is posing can best be phrased: "What gives a national defense contractor the legal right to manufacture a product for the Department of Defense, the design of which may be considered unsafe under consumer tort law standards, and exempts the defense contractor from civil tort liability to pay damages to those injured in the use of the product?" The answer is that when the product is manufactured pursuant to the obligation imposed by the specifications of a federal military procurement contract, that obligation carries with it the right to be exempt from liability for civil damages imposed by conflicting consumer tort law standards.

Congress has enacted legislation which imposes upon the contractor the duty to manufacture the product in the design configuration approved by the Department of Defense. Under 10 U.S.C. § 2452 (1956), Congress has directed the Secretary of Defense to establish military specifications and standards. The Federal Acquisition Regulations System (48 C.F.R. Chapters 1, 2, 51-54, Oct. 1, 1987) and its predecessor, the Defense Acquisition Regulations (32 C.F.R. Chapter 1, Parts 1 to 39, July 1, 1984), implement this statutory directive. These regulations are the federal authority for procurement contracts. Pursuant to their authority, the Government contract includes precise specifications for the product that the military procures from the defense contractor.

The military procurement contract, thus authorized by statute and implemented by regulations, imposes a

legal duty on the defense contractor to manufacture the product in conformance with the design configuration set out in the contract specifications. A correlative of this duty to manufacture the product configuration set forth in the contract with the Department of Defense is the right to manufacture the product in compliance with, and in fulfillment of, the contract without being subjected to civil liability for violation of inconsistent obligations arising under state or federal tort law.

When state law creates an obligation for a product configuration inconsistent with the contract specifications approved by the Department of Defense, such state law is preempted under the Supremacy Clause of the Constitution. U.S. Const. art. VI, cl. 2. When federal tort law creates a standard inconsistent with the specifications approved by the Department of Defense in the procurement of military equipment for the national defense, tort recovery must be denied based on the separation of powers doctrine, in that the courts should not second-guess the military in procurement decisions.

As referred to in more detail in Bell's original brief (Pages 11-13), *Public Utilities Commission of Cal. v. United States*, 355 U.S. 534, 543-546. (1958) illustrates that a federal contract on a subject within the federal government's constitutional sphere preempts state law which attempts to impose obligations inconsistent with the federal contract. This is certainly true where the subject involved is military procurement, which has been constitutionally dedicated to the federal government. In that event, as in the present case, state tort remedies are preempted by federal contracts. In *United States v. Allegheny County*, 322 U.S. 174 (1944), involving a contract between the Government and a defense contractor for the purchase of large field guns, this Court stated:

Every acquisition, holding, or disposition of property by the Federal Government depends upon proper exercise of a constitutional grant of power. In this case no contention is made that the contract with Mesta is not fully authorized by the congressional power to raise and support armies and by adequate congressional authorization to the contracting officers of the War Department. It must be accepted as an act of the Federal Government warranted by the Constitution and regular under statute.

Procurement policies so settled under federal authority may not be defeated or limited by state law. The purpose of the supremacy clause was to avoid the introduction of disparities, confusions and conflicts which would follow if the Government's general authority were subject to local controls. The validity and construction of contracts through which the United States is exercising its constitutional functions, their consequences on the rights and obligations of the parties, the titles or liens which they create or permit, all present questions of federal law not controlled by the law of any state. (322 U.S. at 182-183.)

Where federal maritime tort law is involved (as in *East River S.S. Corp. v. Transamerica Delaval*, 476 U.S. 858, 864-866 (1986) where the Court first recognized a cause of action in strict liability), the same authority vests this Court with the power to establish a defense protecting those who fulfill their obligations under federal military procurement contracts from liability based on tort standards applicable to commercial

products. Whether one calls this a common law principle or statutory interpretation, this Court is called upon to enunciate the standard by which trial courts can resolve the conflicts between federal procurement contract law and consumer tort law.

II.

SHOULD THIS COURT ACT ON THE ISSUE OF MILITARY CONTRACTOR DEFENSE?

In the absence of specific legislation by Congress on the issue, this Court is the appropriate constitutional authority to resolve the conflict between those obligations arising under a federal contract to manufacture the military product as specified, with those obligations of state or federal tort law to make the product "safe" in accordance with consumer tort standards. The "Military Contractor Defense" is not a tort defense, like contributory negligence or assumption of risk, which presupposes that the manufacturer has breached a duty to the injured party but which defeats liability based on the conduct of that party. It is not a tort defense which needs to be created, but rather is a test for resolving conflicts between tort and Government contract obligations.

The function of courts is to resolve conflicts of obligations created by different sources of law. This has been the function of courts whether the conflict involves a contract between private parties, a contract between a private party and a state government and, especially so for this court, where the contract is between a defense contractor and the Department of Defense. The Court should decide whether the obligations imposed on United Technologies Corporation by its contract with the Department of Defense in the procurement of military

equipment for the national defense take precedence over different obligations imposed by consumer tort law.

CONCLUSION

This Court should hold that obligations imposed on a military contractor by a federal contract with the Department of Defense take precedence over obligations imposed on the contractor by state or federal tort law, unless the contractor has failed to warn the government of dangers in the design specifications known to the contractor but not to the Government. Between the contractor's duty to the Government to manufacture the product in satisfaction of the nation's military procurement needs, and the contractor's duty to make the product "safe" under consumer tort law standards, the primary duty is to the Government.

In holding that military contract obligations preempt tort law obligations, the Court would not be making or creating law nor would it be formulating law that protects defense contractors in a situation where ordinarily state law would govern. The Court would be appropriately performing its judicial role of resolving a conflict of obligations. Were this Court to impose upon the manufacturer of military products under federal contract with the Department of Defense the additional duty to manufacture the product in a configuration other than as specified by the contract, i.e., "safe" under consumer tort standards, the Court must then indeed create new law by providing the contractor with the right to violate its contractual obligations with the federal government in order to fulfill its tort law obligations.

Respectfully submitted,
 R. DAVID BROILES*
 BROWN, HERMAN, SCOTT
 DEAN & MILES
 Suite 203
 Fort Worth Club Building
 Fort Worth, Texas 76102
 GEORGE GALERSTEIN
 JAMES W. HUNT
Attorneys for
BELL HELICOPTER TEXTRON, INC.

*Counsel of Record

PROOF OF SERVICE BY MAIL

State of California

ss.

County of Los Angeles

I, the undersigned, say: I am and was at all times herein mentioned, a citizen of the United States and a resident of the County of Los Angeles, over the age of eighteen (18) years and not a party to the within action or proceeding; that my business address is 11333 Iowa Avenue, Los Angeles, California 90025; that on April 12, 1988, I served the within *Supplemental Brief Amicus Curiae of Bell Helicopter Textron, Inc., in Support of Respondent* in said action or proceeding by depositing true copies thereof, enclosed in a sealed envelope with postage thereon fully prepaid, in the United States mail at Los Angeles, California, addressed as follows:

Clerk, United States
 Supreme Court
 One First Street, N.W.
 Washington, D.C. 20543
(Original and forty copies)

Louis S. Franecke, Esq.
 MACK, HAZELWOOD,
 FRANECKE & TINNEY
 221 Pine Street
 Suite 600
 San Francisco,
 California 94104

Dale Haralson, Esq.
 HARALSON, KINERK
 & MOREY
 82 South Stone Avenue
 Tucson, Arizona 85701

Michael J. Pangia, Esq.
 SMILEY, OLSON, GILMAN &
 PANGIA
 1815 H Street N.W.
 Suite 600
 Washington, D.C. 20006

Lewis T. Booker, Esq.
 HUNTON & WILLIAMS
 707 East Main
 Box 1535
 Richmond, Virginia 23212

Kenneth S. Geller, Esq.
 MAYER, BROWN & PLATT
 2000 Pennsylvania Ave. N.W.
 Washington, D.C. 20006

James M. FitzSimons, Esq.
 MENDES & MOUNT
 725 S. Figueroa Street
 Nineteenth Floor
 Los Angeles, California 90017

Joel D. Eaton, Esq.
PODHURST, ORSECK,
PARKS, JOSEFSBERG,
MEADOW, OLIN
800 City National Bank
Building
25 W. Flagler Street
Miami, Florida 33130

I declare under penalty of perjury that the foregoing
is true and correct. Executed on April 12, 1988, at Los
Angeles, California.

Siri Ved K. Khalsa
(Original signed)

SUPPLEMENTAL BRIEF

No. 86-492

JOSEPH F. SPANIOLO, JR.
CLERK

In the Supreme Court of the United States**OCTOBER TERM, 1987**

DELBERT BOYLE, Personal Representative
of the Heirs and Estate of
DAVID A. BOYLE,
Deceased,
Petitioner,

vs.

UNITED TECHNOLOGIES CORP.,
Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT
OF APPEALS FOR THE FOURTH CIRCUIT

**SUPPLEMENTAL BRIEF AMICUS CURIAE OF
GRUMMAN AEROSPACE CORPORATION
IN SUPPORT OF RESPONDENT**

JAMES M. FITZSIMONS
Counsel of Record
MENDES & MOUNT
725 S. Figueroa Street
Los Angeles, California
90017
(213) 955-7700

CHARLES M. SHAFFER, JR.
L. JOSEPH LOVELAND
GARY J. TOMAN
KING & SPALDING
2500 Trust Company
Tower
Atlanta, Georgia 30303
(404) 572-4600

FRANK J. CHIARCHIARO
DOUGLAS B. BESMAN
MENDES & MOUNT
3 Park Avenue
New York, New York 10016
(212) 951-2200
Counsel for Amicus Curiae

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No. 86-492

IN THE
SUPREME COURT OF THE UNITED STATES
OCTOBER TERM 1986

DELBERT BOYLE, Personal Representative
of the Heirs and Estate of
David A. Boyle,
Deceased,

Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT
OF APPEALS FOR THE FOURTH CIRCUIT.

**Supplemental Brief *Amicus Curiae* of Grumman Aero-
space Corporation in Support of Respondent.**

Grumman Aerospace Corporation ("Grumman") respectfully files this supplemental brief *amicus curiae* in support of Respondent, United Technologies Corporation. This brief addresses two issues regarding the allocation of power and responsibility in the federal system that are critical to disposition of this case and the other cases presently before the Court involving the military contractor defense. The first issue is whether national interests require that the nature and scope of the military contractor defense be defined by reference to federal law rather than

state law. The second issue is whether, within the federal government, this Court should defer to Congress in articulating the defense.

I. National interests require that the military contractor defense be defined as a matter of federal law.

Within our system of government, the power and responsibility to provide for the common defense is vested exclusively in the national government, not the states. *In re Tarble*, 80 U.S. (13 Wall.) 397, 408 (1871). As a result, both the relationship between the military and individual servicemen and the relationship between the military and the manufacturers of weapons systems are "distinctively federal" in character. See *United States v. Standard Oil Co.*, 332 U.S. 301, 305 (1947); *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666, 672 (1977). And the distinctively federal character of these relationships means that it is appropriate to apply federal common law "to protect the relation once formed from harms inflicted by others." *Standard Oil*, 332 U.S. at 306.

The military contractor defense involves the confluence of these two distinctively federal relationships. The defense determines whether a serviceman injured by an allegedly defectively designed weapons system can maintain a suit against the manufacturer.¹ Such a suit directly affects both the relationship of the serviceman to the military and the relationship of the manufacturer of the weapons system to the military. Maintaining the proper balance in these distinctively federal relationships creates "an overriding federal interest in the need for a uniform

¹Given the nature of the defense, it has been applied exclusively in situations where it was clear that the serviceman's injuries were suffered "incident to service" and that the government itself was therefore immune from suits. See *United States v. Johnson*, 107 S. Ct. 2063, 2069 (1987).

rule of decision" in such cases, and thus dictates that federal law, rather than the laws of individual states, be applied. See *Illinois v. City of Milwaukee*, 406 U.S. 91, 105 n.6 (1972).

This Court has consistently recognized the overriding federal interest involved in the relationship of a serviceman to the government and has therefore applied federal law to protect and define the relationship. See, e.g., *Standard Oil*, 332 U.S. at 310 (emphasizing the "need for uniformity" in determining the government's right to be indemnified for injuries to servicemen); *United States v. Johnson*, 107 S. Ct. 2063, 2068 (1987) (reaffirming need for "simple, certain, and uniform compensation for injuries or death of those in armed services"), see also *Howard v. Lyons*, 360 U.S. 593 (1959). Because the movement of troops and the deployment of weapons systems are dictated by national needs, there is "no good reason" for the law governing injuries suffered by the serviceman to "vary in accordance with the different rulings of the several states, simply because the soldier marches or today perhaps as often flies across state lines." *Standard Oil*, 332 U.S. at 310.

Similarly, the relationship between the military and manufacturers of weapons systems also implicates national needs, and the tradeoffs between additional safety which are inherent in weapons system design must be evaluated by reference to uniform national standards defined under federal law. This Court has expressly held that the relationship between the government and a manufacturer of military weapons is governed by federal law. In *United States v. Allegheny County*, 322 U.S. 174 (1944), the Court analyzed a contract between the government and a manufacturer of heavy equipment pursuant to which the manufacturer agreed to produce large field guns. Explaining that "no contention is made that the

contract with [the manufacturer] is not fully authorized by the congressional power to raise and support armies and by adequate congressional authorization to the contracting officers of the War Department," 322 U.S. at 182, the Court held that federal law controlled the contract and the rights and obligations of the parties to the contract:

Procurement policies so settled under federal authority may not be defeated or limited by state law. The purpose of the supremacy clause was to avoid the introduction of disparities, confusions and conflicts which would follow if the government's general authority were subject to local controls. *The validity and construction of contracts through which the United States is exercising its constitutional functions, their consequences on the rights and obligations of the parties, the titles or liens which they create or permit, all present questions of federal law not controlled by the law of any state.*

322 U.S. at 183 (emphasis added). Clearly, to allow each state to determine by reference to its own law whether a military weapons system approved and purchased by the federal government is defectively designed would introduce precisely the "disparities, confusions and conflict" into the "rights and obligations" of the manufacturer which this Court found untenable in *Allegheny County*.

Grumman recognizes that a federal policy in favor of a uniform rule of decision may not be sufficient to displace state substantive law with federal law when the federal interests are outweighed by substantial and legitimate state interests². In the military contractor cases, however, both

²The question of whether federal law should define the military contractor defense in a suit relating to injuries suffered by a civilian (Footnote continued on following page.)

of the relationships involved—that of the soldier to the military and that of the military to the manufacturer of the weapon system—are framed by national interests, not state concerns, and are governed by federal law. While the issue of liability of a manufacturer to a serviceman in this context may be complex, "[w]hatever considerations are thought to predominate, it is plain that the problems involved are uniquely federal in nature." See *Banco Nacional de Cuba v. Sabbatino*, 376 U.S. 398, 424 (1964) (holding that federal law controlled the application of the act of state doctrine). Stated differently, the manufacturer of a military weapons system owes its primary duty to the United States military, and just as that duty is defined by national concerns, any breach of that duty should be assessed by reference to a uniform federal law. See *Bynum v. FMC Corp.*, 770 F.2d 556, 570 (5th Cir. 1985).

Applying federal common law to define the nature and scope of the military contractor defense is also consistent with principles of federalism and comity. When dealing with a problem that affects each state alike and the nation as a whole more than any particular state, "[e]xperimentation and varying local solutions are positively undesirable." Comment: *The Federal Common Law*, 82 Harv. L. Rev. 1512, 1521 (1969). Accordingly, in such areas, a federal rule of decision is appropriate even though the claim may be brought under the diversity jurisdiction of the fed-

(Footnote continued.)

raises a more difficult question because the relationship between a civilian and the government is of a different character from the relationships between the government and the military contractor and the government and its servicemen. Grumman acknowledges that such a case would present a more difficult balancing of the national interests in obtaining sophisticated weapons and the legitimate state interest in insuring compensation for private citizens. In any event, this issue is not presently before the Court and need not now be resolved.

eral courts. *Sabbatino*, 376 U.S. at 424;³ *Howard v. Lyons*, 360 U.S. 593, 597 (1959) (holding that federal law controls a federal officer's claim of privilege in a defamation action brought under state law). Certainly the exigencies of national defense, like issues of foreign relations, affect the nation as a whole more than any particular state and require application of federal law.⁴

³In *Sabbatino* the Court noted that it "could perhaps in this diversity action avoid the question of whether federal or state law is applicable" because New York had adopted the act of state doctrine as part of that state's substantive law. 376 U.S. at 424. Nonetheless, the Court held that federal law applied, because "we are constrained to make it clear that an issue concerned with a basic choice regarding the competence and function of the Judiciary and the National Executive in ordering our relationships with other members of the international community must be treated exclusively as an aspect of federal law." *Id.* at 425. The present case involves the same fundamental questions regarding the role of the judiciary and the other branches of our national government (see discussion at Section II *infra*) and should also be determined under federal law.

⁴The federal law, once formulated, should apply in both federal and state courts. Leaving the states free to establish their own versions of the military contractor defense for application in state courts would invite precisely the type of forum shopping between state and federal courts that the decision in *Erie R. Co. v. Tompkins*, 304 U.S. 64 (1938), was designed to prevent. The principles of separation of powers that define the military contractor defense for the federal courts (see discussion at Section II *infra*) are precisely the same, regardless of whether that court sits as a diversity court or a court exercising jurisdiction under a federal statute such as the Death on the High Seas Act. To allow a state court to examine issues of military weapons system design which cannot be examined in the federal courts would not only produce disparate results on the same claims, but would also mean that "the purposes behind the [defense] could be as effectively undermined as if there had been no federal pronouncement on the subject." *Sabbatino*, 476 U.S. at 424.

II. Separation of powers concerns require the judiciary to recognize the *McKay* standard for the military contractor defense.

Just as principles of federalism require that the military contractor defense be determined by federal law, the doctrine of separation of powers within the branches of the federal government requires that the Judiciary recognize the defense. The military contractor defense operates as a restraint on judicial power to second-guess military decisions regarding the designs of weapons systems. The fact that Congress has not defined the nature or scope of the defense through legislation does not alter the Judiciary's obligation to acknowledge this restraint.

The military contractor defense is not a "defense" in traditional terms. Rather, it defines the justiciability of a serviceman's claim challenging the design of a military weapons system. The Constitution vests the responsibility for making decisions regarding the weaponry of the armed forces with the Executive and Legislative branches of government, and these decisions may not be second-guessed by the Judiciary. See *Gilligan v. Morgan*, 413 U.S. 1, 8-11 (1973). The military contractor defense constitutes a recognition by the Judiciary that a serviceman's claim challenging a weapons system's design is nonjusticiable if adjudicating the claim would require the courts to assess the wisdom of a military decision approving the design of a weapons system.⁵

⁵The fact that the United States is not a direct party to such a suit does not authorize this judicial intrusion, for "[e]ven if military negligence is not specifically alleged in a tort action, a suit based upon service-related activity necessarily implicates the military judgments and decisions that are inextricably intertwined with the conduct of the military mission." *United States v. Johnson*, 107 S. Ct. 2063, 2069 (1987).

Because the military contractor defense acts as a restraint on judicial power, it is not a matter that the courts may ignore unless and until Congress speaks. Recognizing the defense does not mean that this Court is "making law" in an area where Congress should act. Instead, recognition of the defense is mandated by established concepts of separation of powers, and the courts must, out of deference to the other branches of government, apply the defense despite Congressional silence on the issue.⁶ To hold otherwise would infer from Congressional silence an endorsement for an expanded role by the Judiciary in overseeing military affairs.⁷

The same separation of powers considerations that require the Judiciary to apply the military contractor defense argue for adoption of the standard first articulated in *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984). The *McKay* standard, which has been substantially adopted by every Circuit Court of Appeals to consider the issue ex-

⁶Arguably, Congress could define the elements of the defense if it chose to do so. Logically, however, there is no need for Congress to do so, because consistent application of the separation of powers doctrine requires the courts to apply the military contractor defense at least until Congress expressly authorizes servicemen to maintain a suit against the manufacturers of weapons systems approved by the military.

⁷The reluctance of this Court in *United States v. Standard Oil*, 332 U.S. 301 (1947), to create a remedy for the United States does not argue against judicial recognition of the military contractor defense. As one commentator has explained, the *Standard Oil* "opinion should not be read as imposing judicial paralysis in such a case where Congress has neglected to act. What the Court refused to do was create a novel remedy that it thought would peculiarly impinge upon a prerogative of Congress." Hill, *The Lawmaking Power of the Federal Courts: Constitutional Prescription*, 67 Colum. L. Rev. 1024, 1039 (1967). In this case, the Court is not asked to create a remedy, but instead to recognize the boundaries of judicial competence.

cept for the Eleventh Circuit,⁸ provides a test "that is relatively clear and that can be discerned with less extensive inquiry into military matters," *United States v. Stanley*, 107 S. Ct. 3054, 3063 (1987), than the standard adopted by the Eleventh Circuit in *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985), *petition for cert. filed*, 54 U.S.L.W. 3632 (U.S. Mar. 17, 1986) (No. 85-1529). Simply stated, the *Shaw* standard is critically flawed because it requires such a detailed inquiry into the military's decision-making process that the determination of whether the elements of the defense have been met would undermine the very purpose for the defense. As the Court recently explained:

A test for liability that depends on the extent to which particular suits would call into question military discipline and decision-making would itself require judicial inquiry into, and hence intrusion upon, military matters. Whether a case implicates these concerns would often be problematic, raising the prospects of compelled depositions and trial testimony by military officers concerning the details of their military commands. Even putting aside the risk of erroneous judicial conclusions (which would becloud military decision-making), the mere process of arriving at correct conclusions would disrupt the military regime.

United States v. Stanley, 107 S. Ct. at 3063.

⁸See *Tozer v. LTV Corp.*, 792 F.2d 403 (4th Cir. 1986), *petition for cert. filed*, 55 U.S.L.W. 3337 (U.S. Oct. 23, 1986) (No. 86-674); *Bynum v. FMC Corp.*, 770 F.2d 556 (5th Cir. 1985); *In re Air Crash Disaster at Mannheim, Germany*, 769 F.2d 115 (3d Cir. 1985), *cert. denied*, 106 S. Ct. 851 (1986); *Tillett v. J.I. Case*, 756 F.2d 591 (7th Cir. 1985); *Koutsoubos v. Boeing Vertol*, 755 F.2d 352 (3d Cir.), *cert. denied*, 106 S. Ct. 72 (1985); but see *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985), *petition for cert. filed*, 54 U.S.L.W. 3632 (U.S. Mar. 17, 1986) (No. 85-1529).

In summary, the doctrine of separation of powers requires that the Judiciary defer to the Executive and the Legislature on matters affecting the military. The standard for the military contractor defense formulated in *McKay* provides a logical and workable framework for determining when such deference is appropriate. Grumman respectfully submits that this Court should adopt the *McKay* standard as a matter of federal common law and thereby provide a "simple, certain, and uniform" mechanism for resolving controversies in this sensitive area.

Conclusion.

The judgment of the Court of Appeals should be affirmed.

Respectfully submitted,

JAMES M. FITZSIMONS
Counsel of Record
MENDES & MOUNT
725 S Figueroa Street
Los Angeles, California
90017

CHARLES M. SHAFFER, JR. (213) 955-7700

L. JOSEPH LOVELAND

GARY J. TOMAN

KING & SPALDING

2500 Trust Company

Tower

Atlanta, Georgia 30303

(404) 572-4600

FRANK J. CHIARCHIARO

DOUGLAS B. BESMAN

MENDES & MOUNT

3 Park Avenue

New York, New York

10016

(212) 951-2200

Counsel for *Amicus Curiae*

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SUPPLEMENTAL BRIEF

No. 86-492

Supreme Court, U.S.
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CLERK

In the Supreme Court of the United States

OCTOBER TERM, 1987

DELBERT BOYLE, personal representative of the heirs
and estate of David A. Boyle, deceased, PETITIONER

v.

UNITED TECHNOLOGIES CORPORATION, RESPONDENT

On Writ of Certiorari to the United States
Court of Appeals for the Fourth Circuit

**SUPPLEMENTAL BRIEF FOR AMICI CURIAE
AEROSPACE INDUSTRIES ASSOCIATION,
AMERICAN GEAR MANUFACTURERS ASSOCIATION,
ELECTRONIC INDUSTRIES ASSOCIATION,
GENERAL AVIATION MANUFACTURERS
ASSOCIATION,
NATIONAL ASSOCIATION OF MANUFACTURERS,
NATIONAL SECURITY INDUSTRIAL ASSOCIATION,**

(Additional Amici Curiae Listed On Inside Cover)

KENNETH S. GELLER

Counsel of Record

ANDREW L. FREY

PATRICIA A. MCCOY

Mayer, Brown & Platt

2000 Pennsylvania Ave., N.W.

Washington, D.C. 20006

(202) 463-2000

Attorneys for Amici Curiae

THE BOEING COMPANY,
EATON CORPORATION,
EMERSON ELECTRIC COMPANY,
FMC CORPORATION,
THE GOODYEAR TIRE AND RUBBER COMPANY,
HUGHES AIRCRAFT COMPANY,
IBM CORPORATION,
ITT DEFENSE TECHNOLOGY CORPORATION,
LITTON INDUSTRIES, INC.,
LOCKHEED CORPORATION,
LTV AEROSPACE AND DEFENSE COMPANY,
MARTIN MARIETTA CORPORATION,
McDONNELL DOUGLAS CORPORATION,
MOTOROLA, INC.,
OSHKOSH TRUCK CORPORATION,
RAYTHEON COMPANY,
ROCKWELL INTERNATIONAL CORPORATION,
THE SINGER COMPANY,
TEXAS INSTRUMENTS, INC.,
AND UNISYS CORPORATION
IN SUPPORT OF RESPONDENT

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**SUPPLEMENTAL BRIEF FOR AMICI CURIAE
AEROSPACE INDUSTRIES ASSOCIATION, ET AL.**

Amici curiae Aerospace Industries Association, *et al.*, submit this supplemental brief, pursuant to the Court's order of March 7, 1988, to address an issue that arose during the oral argument of this case. Specifically, several Justices questioned whether the Court has the authority to recognize a uniform government contractor defense under federal common law. As explained in our opening brief (NSIA Am. Br. 17), every court of appeals to consider the question has agreed that the courts have this authority. Indeed, petitioner has never challenged that proposition.

As we show below, this conclusion is unquestionably correct. This case affects the national security interest of the United States—an essential federal interest that should be governed by federal rather than state law. The substance of this federal law is commonly derived from federal statutes, but in the absence of a controlling statute it is the duty of this Court to fashion the governing legal rules.

ARGUMENT

**THE FEDERAL COURTS HAVE THE AUTHORITY TO
RECOGNIZE A FEDERAL COMMON LAW GOVERN-
MENT CONTRACTOR DEFENSE TO PROTECT SUB-
STANTIAL INTERESTS OF THE FEDERAL GOVERN-
MENT**

Suits against defense contractors alleging design defects in military equipment often arise under federal law. In *Tozer*, 792 F.2d 403 (4th Cir. 1986); *Shaw*, 778 F.2d 736 (11th Cir. 1985); and *McKay*, 704 F.2d 444 (9th Cir. 1983), for example, the injuries occurred on the high seas, and therefore the plaintiff's cause of action and the defenses available to the defendant were determined by judge-made federal maritime law. See *Texas Industries, Inc. v. Radcliff Materials, Inc.*, 451 U.S. 630, 641-642 & n.14 (1981); *Sea-Land Services, Inc. v. Gaudet*, 414 U.S. 573, 588 n.22 (1974). In such circumstances, although Congress is of course free to alter either

the cause of action or the terms of any defense, there can be little doubt that, in the first instance, the federal courts have the authority to recognize a government contractor defense, if such a defense is found to be necessary to protect substantial interests of the federal government.

No different result follows where the plaintiff's cause of action arises, as here, under state tort law. In that context as well, it has long been held that the federal courts possess interstitial law-making power to ensure that the rules imposing liability do not frustrate legitimate federal concerns. As the Fifth Circuit stated in *Bynum v. FMC Corp.*, 770 F.2d 556, 557 (5th Cir. 1985), "[t]hat a plaintiff's claim arises under state law does not preclude [the] formulation of [a] federal defense in cases raising issues of uniquely federal concern." See also *Tozer*, 792 F.2d at 409 n.3. For the reasons discussed in our opening brief (NSIA Am. Br. 13-17), the federal government's compelling interest in the smooth functioning of the military procurement process plainly warrants recognition of a government contractor defense, under federal common law, to state law causes of action that would frustrate that federal interest.

A. This Court Has Frequently Recognized That Substantial Federal Interests Require The Protection Of Federal Common Law Rules

By now, it is beyond dispute that this Court will protect important federal interests as a matter of federal common law where litigation threatens to burden essential federal programs. See, e.g., *United States v. Kimbell Foods, Inc.*, 440 U.S. 715, 726-727 (1979); *United States v. Allegheny County*, 322 U.S. 174, 182-183 (1944); *Clearfield Trust Co. v. United States*, 318 U.S. 363, 366-367 (1943). In *Clearfield Trust*, for example, the United States sued to recover the amount of a government check bearing a forged endorsement. The district court held that the rights of the parties were to be determined by the law of Pennsylvania, but this Court unanimously disagreed (318 U.S. at 366) (citations omitted):

The rights and duties of the United States on commercial paper which it issues are governed by federal

rather than local laws. * * * The authority to issue the check had its origin in the Constitution and the statutes of the United States and was in no way dependent on the laws of Pennsylvania or of any other state. The duties imposed upon the United States and the rights acquired by it as a result of the issuance find their roots in the same federal sources.

Thus, as the Court remarked in *United States v. Little Lake Misere Land Co.*, 412 U.S. 580, 592-593 (1973), where activities "aris[e] from and bea[r] heavily upon a federal * * * program," federal law does not permit "state law [to] govern of its own force." State law cannot be allowed to provide the rule of decision where it "would frustrate specific objectives of the federal programs." *Kimbell Foods*, 440 U.S. at 728. See also *Texas Industries*, 451 U.S. at 641 ("our federal system does not permit the controversy to be resolved under state law" where "the authority and duties of the United States as sovereign are intimately involved").

Unquestionably, the federal government's ability to provide for the common defense and, accordingly, its control over military procurement, are federal interests of the highest order that are entitled to this protection. More than a century ago, this Court held that "[n]o interference with the execution of [the] power of the National government in the formation, organization, and government of its armies by any State officials could be permitted without greatly impairing the efficiency, if it did not utterly destroy, this branch of the public service." *In re Tarble*, 80 U.S. (13 Wall.) 397, 408 (1872). The Court has consistently adhered to that view ever since. See, e.g., *Feres v. United States*, 340 U.S. 135, 143-144 (1950); *United States v. Standard Oil Co.*, 332 U.S. 301, 305-306 (1947). By the same token, "[t]he relationship between the Government and its suppliers of ordnance is certainly no less 'distinctively federal in character' than the relationship between the Government and its soldiers." *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666, 672 (1977).

It was for these reasons that the Court concluded in *United States v. Allegheny County*, *supra*, that federal rather than state law determined whether a private defense contractor was liable for local property taxes on government manufacturing machinery within its possession. Noting that a state law foreclosure action against the contractor could bring production at the defense plant to a halt, the Court concluded that the tax assessment directly impinged on "the congressional power to raise and support armies." 322 U.S. at 182. This consideration necessitated the application of federal common law, because "[p]rocurement policies so settled under federal authority may not be defeated or limited by state law." *Id.* at 183. See also *United States v. State Tax Commission*, 421 U.S. 599, 612-613 (1975).

This case affects the federal government's ability to provide for the national defense to an even greater degree than did *Allegheny County*. In *Allegheny County*, the prospect of judicial interference with the manufacture of military equipment through state law foreclosure proceedings was remote and indirect. Here, by contrast, if state law tort claims such as petitioner's were allowed to proceed, without due consideration of the federal interests at stake, judicial second-guessing of military design decisions would be a foregone conclusion. See NSIA Am. Br. 13-17. Since the defense contract between respondent and the military, like the contract in *Allegheny County*, was "fully authorized by the congressional power to raise and support armies and by adequate congressional authorization to the contracting officers of the War Department" (see 322 U.S. at 182), this case surely implicates federal interests sufficiently "to warrant the protection of federal law." *Kimbell Foods*, 440 U.S. at 727. See *Bynum*, 770 F.2d at 568-570.

B. Federal Common Law Rules Also Are Required By The Need For A Uniform National Standard

In determining whether federal common law should provide the governing legal rule, this Court also has considered whether "a uniform national rule is necessary to

further the interests of the Federal Government" (*Miree v. DeKalb County*, 433 U.S. 25, 29 (1977)). "Undoubtedly, federal programs that 'by their nature are and must be uniform in character throughout the Nation' necessitate formulation of controlling federal rules." *Kimbell Foods*, 440 U.S. at 728 (quoting *United States v. Yazell*, 382 U.S. 341, 354 (1966)). In short, "where there is an overriding federal interest in the need for a uniform rule of decision," this Court repeatedly has fashioned a single federal standard. *Illinois v. City of Milwaukee*, 406 U.S. 91, 105 n.6 (1972). See *Clearfield Trust*, 318 U.S. at 366-367.

Nowhere has the Court resisted incursions by the states more vigorously than in the area of national defense. In case after case, the Court has held that the federal need for national uniformity and unfettered discretion in the military context defeats local interests even in traditional state domains such as family law and property rights. See, e.g., *United States v. 93,970 Acres of Land*, 360 U.S. 328, 332-333 (1959); *Wissner v. Wissner*, 338 U.S. 655, 658 (1950). See also *Stencel Aero*, 431 U.S. at 672; *Standard Oil*, 332 U.S. at 310 (since "the government-soldier relation [is] distinctively and exclusively a creation of federal law," the government's ability to recover costs of an injured soldier's hospitalization and disability pay turns on a federal, rather than state, rule of decision).

The federal government's freedom from state interference is equally crucial in the area of military procurement, as *Allegheny County* confirms. There, the Court feared that deficiency proceedings against private contractors could result in a lock-out against the government if local tax laws were absorbed into the federal law of military procurement contracts (322 U.S. at 187):

If the tax is collected by selling the land out from under the machinery, the effect on its usefulness to the Government would be almost as disastrous as to sell the machinery itself. The coercion of payment from compelling the Government to move its prop-

erty and interrupt production at the Mesta plant would defeat the purpose of the Government in owning and leasing it.

In order to avoid the "disparities, confusions and conflicts which would follow if the Government's general [procurement] authority were subject to local controls" (*id.* at 183), the Court held that local revenue concerns must yield to the national need for military production, as expressed in federal common law rules. *Ibid.*

As we discussed in our opening brief (see NSIA Am. Br. 13-17), tort judgments against defense contractors for flaws in the design of military equipment would undermine the military's control over weapons procurement, and with even greater certainty than the tax assessment in *Allegheny County*. Petitioner, in essence, asked the jury, applying Virginia law, to second-guess weapons design decisions that the military reviewed and approved. But only the Defense Department—not judges or juries—is competent to make the final trade-offs among safety and competing military needs such as combat effectiveness. "[T]o hold military suppliers liable for defective designs where the United States set or approved the design specifications would thrust the judiciary into the making of military decisions." *McKay*, 704 F.2d at 449.

Moreover, it is hard to imagine a context in which there is a greater need for a single nationwide rule. If innovative technology and combat readiness are to remain the hallmarks of our national defense, the terms of defense procurement contracts cannot be subject to the tort laws of all 50 states. See *Allegheny County*, 322 U.S. at 183. There is "no good reason" why Defense Department standards for military design "should vary in accordance with the different rulings of the several states, simply because [a] soldier marches or today perhaps as often flies across state lines." *Standard Oil*, 332 U.S. at 310; see *United States v. Johnson*, 107 S.Ct. 2063, 2068 (1987). Indeed, this case illustrates the anomalies that would arise if state, rather than federal, law determined the existence or scope of the government contractor

defense. The CH-53 helicopter crashed a mile off the Virginia coast; if the accident had occurred another few miles offshore, suit would have been brought under the Death on the High Seas Act (DOHSA), 46 U.S.C. § 761 *et seq.*, and federal law unquestionably would have applied. See *Offshore Logistics, Inc. v. Tallentire*, 477 U.S. 207, 212-217 (1986); *Tozer*, 792 F.2d at 409 & n.3 (companion case to *Boyle* decided by Fourth Circuit under DOHSA).

This sort of diversity and uncertainty in the governing rules would create an intolerable situation for government defense contractors—and for the military personnel with whom they work closely in designing military equipment. See NSIA Am. Br. 6-13. The manner in which contractors and the Department of Defense must structure their procedures and decisionmaking in the design of weapons systems cannot be made to depend upon the fortuity of where the defense plant is located or the place—unknown and unknowable at the time of production—where some accident may occur in the future. There would be an inevitable ratchet effect, pressuring contractors to comply with the standards set by the state with the most stringent requirements, at the cost of compromising the military usefulness of the product. Without question, "[t]here is a significant federal interest in uniformity" (*Bynum*, 770 F.2d at 571 n.19) on these matters, which only federal common law can protect.

C. There Is Ample Authority For Recognition Of A Federal Common Law Defense In Suits Nominally Between Private Parties

This Court's authority to fashion federal common law rules to protect vital federal interests is not limited to situations in which state law is entirely preempted. Rather, the Court has routinely recognized federal common law defenses, so that state law causes of action do not lead to liability in circumstances that would adversely affect the operations of the federal government. See, *e.g.*, *Howard v. Lyons*, 360 U.S. 593, 597 (1959). In *Wheel-
din v. Wheeler*, 373 U.S. 647 (1963), for example, the

Court observed that while "suits for damages for abuse of power [by] federal officials are usually governed by local law, [f]ederal law * * * supplies the defense * * * or immunity from suit." *Id.* at 652 (citations omitted). Thus, the fact that the federal question in this case arises in the context of an immunity or defense does not present any impediment to the creation of federal common law.

In fact, the law of immunity as a defense to damages actions against private individuals serving in the government has "in large part been of judicial making." *Barr v. Matteo*, 360 U.S. 564, 569 (1959) (plurality opinion); see *Westfall v. Erwin*, 108 S.Ct. 580, 583 (1988). In *Howard v. Lyons*, *supra*, the Court recognized a federal common law immunity from a state law defamation suit against a naval shipyard commander. 360 U.S. at 597-598. The Court stated that, in "the absence of legislative action by Congress," the validity of the privilege was "to be formulated by the courts" applying federal common law (*id.* at 597):

The authority of a federal officer to act derives from federal sources, and the rule which recognizes a privilege under appropriate circumstances * * * is one designed to promote the effective functioning of the Federal Government. No subject could be one of more peculiarly federal concern, and it would deny the very considerations which would give the rule of privilege its being to leave determination of its extent to the vagaries of the laws of the several States. Cf. *Clearfield Trust v. United States*, 318 U.S. 363.

Similarly, the government contractor defense is a judicially-formulated immunity or defense designed to ensure "the effective functioning of the Federal Government." As in the case of suits against federal employees, state tort law is not entirely preempted in suits against military contractors arising out of their federal responsibilities. State tort law is, however, subject to the limitations of the federal defense—which exists to prevent state law

from being applied in situations where the imposition of liability would frustrate or burden important federal policies and objectives. See *Westfall*, 108 S.Ct. at 583.

Likewise, the fact that the United States is not formally a party to this litigation in no way diminishes the importance of the federal interests at stake or the need to protect them. See *Banco Nacional de Cuba v. Sabbatino*, 376 U.S. 398, 424-427 (1964); Comment, *Tort Remedies for Servicemen Injured By Military Equipment: A Case for Federal Common Law*, 55 N.Y.U. L. Rev. 601, 612-613 (1980). In extending federal tax immunity to a military contractor in *Allegheny County*, the Court emphasized that immunity cases almost always involve claims against private individuals (322 U.S. at 187-188) (emphasis added):

The "Government" is an abstraction, and its possession of property largely constructive. Actual possession and custody of Government property nearly always are in someone who is not himself the Government but acts in its behalf and for its purposes. He may be an officer, an agent or a contractor.

Nonetheless, "neither he nor the Government [could] be taxed for the Government's property interest." *Id.* at 188.

Here, too, the Defense Department, like the War Department in *Allegheny County*, "could have assembled an organization, created a government-owned corporation and erected a plant which would have been wholly * * * immune [from liability]. But for reasons of time and policy it chose to utilize a going concern under private management and ownership." 322 U.S. at 177 (citation omitted). That policy decision did not deprive the Court of the power to assure federal control of the military procurement process under federal common law in *Allegheny County*. Nor does it do so in this case. Needless to say, although the United States is not a named defendant in petitioner's suit, it has a compelling interest in the question "[w]hether [a] military contractor defense is available, and what a contractor must prove to estab-

lish it" (U.S. Am. Br. 1), as evidenced by the Court's request for the views of the Solicitor General prior to the grant of certiorari (106 S.Ct. 2243 (1986)) and by the federal government's active participation (including oral argument) as amicus curiae.

In sum, as explained in our opening brief, the government contractor defense is vitally important to protecting the integrity of the federal government's military procurement efforts. If the Court does not concur in that conclusion, then the question whether it has the power to recognize a federal common law defense becomes of little moment. If, on the other hand, the Court agrees that the government contractor defense is essential to protect a core function of the federal government, we submit that it is inconceivable that the Court would be powerless to recognize the defense. Congress, of course, has plenary authority to enact a statute displacing federal common law in cases of this sort. See, e.g., *Illinois v. City of Milwaukee*, 406 U.S. at 107; *City of Milwaukee v. Illinois*, 451 U.S. 304, 313-314 (1981). Until that time, however, it is the duty of this Court to "declare the governing law in areas comprising issues substantially related to an established program of government operation" (*Little Lake Misere*, 412 U.S. at 593), particularly where, as here, there is a patent and undeniable need for national uniformity.

CONCLUSION

The judgment of the court of appeals should be affirmed.

Respectfully submitted.

KENNETH S. GELLER

Counsel of Record

ANDREW L. FREY

PATRICIA A. MCCOY

Mayer, Brown & Platt

2000 Pennsylvania Ave., N.W.

Washington, D.C. 20006

(202) 463-2000

Attorneys for Amici Curiae

SUPPLEMENTAL BRIEF

IN THE
Supreme Court of the United States

OCTOBER TERM, 1987

DELBERT BOYLE, PERSONAL REPRESENTATIVE OF THE
HEIRS AND ESTATE OF DAVID A. BOYLE, DECEASED,

Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,

Respondent.

On Writ of Certiorari to the United States Court of Appeals
for the Fourth Circuit

SUPPLEMENTAL BRIEF AMICUS CURIAE OF THE
CHAMBER OF COMMERCE OF THE UNITED STATES
IN SUPPORT OF THE RESPONDENT

HERBERT L. FENSTER

Counsel of Record

RAYMOND B. BIAGINI

CHARLOTTE D. YOUNG

McKENNA, CONNER & CUNEO

1575 Eye Street, N.W.

Washington, D.C. 20005

(202) 789-7500

Of Counsel:

ROBIN S. CONRAD

NATIONAL CHAMBER

LITIGATION CENTER, INC.

1615 H Street, N.W.

Washington, D.C. 20062

(202) 463-5337

Attorneys for the Amicus Curiae

April 13, 1988

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IN THE
Supreme Court of the United States

OCTOBER TERM, 1987

No. 86-492

DELBERT BOYLE, PERSONAL REPRESENTATIVE OF THE
HEIRS AND ESTATE OF DAVID A. BOYLE, DECEASED,
Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,
Respondent.

On Writ of Certiorari to the United States Court of Appeals
for the Fourth Circuit

SUPPLEMENTAL BRIEF AMICUS CURIAE OF THE
CHAMBER OF COMMERCE OF THE UNITED STATES
IN SUPPORT OF THE RESPONDENT

On March 7, 1988, the Court invited supplemental briefs on reargument in this action. In the instant brief, the Chamber of Commerce of the United States ("Chamber") addresses several points raised at oral argument, and brings a related pending case to the Court's attention.

1. The Government Contract Defense Impacts the Federal Fisc and Is Therefore Appropriately a Matter of Federal Common Law

As the Chamber emphasized in its initial brief, the government contract defense should be governed by federal law because it concerns the relationship between the

federal government and its contractors. Chamber of Commerce Amicus Brief at 22-26. Because the Court, at oral argument, questioned the need to carve out an area of federal common law for the defense, the Chamber briefly addresses the issue below, discussing yet another reason for the Court to apply federal common law: the potential impact of the defense on the federal fisc.

In *Clearfield Trust*, one of the first decisions regarding this issue (and to which the Court referred at oral argument), the Court held that the application of federal common law was particularly necessary where liability affects the federal fisc. *Clearfield Trust Co. v. United States*, 318 U.S. 363 (1943); see also *United States v. Walker Dunlap & Sons, Inc.*, 800 F.2d 1232, 1236 (3d Cir. 1986) (the need to protect the federal fisc justifies application of federal common law). If a government contractor is held liable for a tort arising out of its performance of a government contract, in all likelihood the monies for the judgment, either directly or indirectly, will come from the Treasury. For example, if the contract in question contains an indemnity provision such as is required in cost-type contracts, the government would be obliged to indemnify the contractor to the extent it was not covered by insurance.¹ The federal fisc would be affected indirectly through the costs of attorney's fees and insurance, both of which are allowable costs under a cost-type contract. Similarly, in a fixed price contract, if denied the defense and found liable, the contractor would be forced to raise future prices to the government at the expense of the federal fisc.

¹ In fact, under *Land v. Dollar*, 330 U.S. 731, 734, 738 (1947), a case is "against the United States" if "the judgment sought would expend itself on the public treasury or domain, or interfere with the public administration." Thus, to the extent the government is liable for claims asserted by third parties pursuant to its indemnity obligations, the suit is actually against the government.

In addition to the impact on the federal fisc, the Court's recent decision in *Westfall v. Erwin*, 108 S. Ct. 580 (1988), also supports adoption of federal common law for the government contract defense. The Court stated in *Westfall* that "the scope of absolute official immunity afforded federal employees is a matter of federal law." *Id.* at 583 (emphasis added) (citing *Barr v. Mateo*, 360 U.S. 564, 569 (1959) (the law of privilege has "in large part been of judicial making"), and *Howard v. Lyons*, 360 U.S. 593, 597 (1959) ("[n]o subject could be one of more peculiarly federal concern [and] must be judged by federal standards, to be formulated by the courts in the absence of legislative action by Congress")). The unique federal interests presented in both *Boyle* and *Westfall* justify the application of federal law, whether it applies to federal official immunity or the government contract defense. State tort law in both cases remains intact; the only question addressed by federal law is whether a particular defense applies.

Thus, the government contract defense is inextricably bound in federal considerations; the nexus between the defense and the federal government is broad and all-encompassing. The defense arises from the special relationship between the federal government and a federal government contractor; the defense arises out of decisions made by the military, a uniquely federal body; and, as described above, the defense impacts the federal fisc.

2. The Products Covered by the Defense Should Include Commercial Products Which Have Been Used for Unique Military Purposes

Another issue raised by the Court at oral argument is what types of products should be covered: commercial products, commercial products which have been adapted to become military products, or solely military products. *Amicus curiae* propose three categories of products which are appropriately covered by the defense:

- a. Those which are uniquely military, e.g., *In re Air Crash Disaster at Mannheim Germany*, 769 F.2d 115, 121 (3d Cir. 1985) (Chinook helicopter was "undisputably" designed for military use), *cert. denied*, 474 U.S. 1082 (1986);
- b. Those which are militarized, e.g., *Tillet v. J.I. Case Co.*, 756 F.2d 591, 596 (7th Cir. 1985) (front-end loader designed for government without roll-over protection qualifies as "military equipment"); *Sanner v. Ford Motor Co.*, 144 N.J. Super. 1, 364 A.2d 43 (1976) (at the request of the military commercial jeep produced without safety belts or roll bars), *aff'd*, 154 N.J. Super. 407, 381 A.2d 805 (1977), *certif. denied*, 75 N.J. 616, 384 A.2d 846 (1978); and
- c. Those which are produced as commercial items but are subsequently used by the military for a unique military purpose or in a manner which differs from normal commercial protocols, e.g., *In re "Agent Orange" Product Liability Litigation*, 534 F. Supp. 1046, 1057 (E.D.N.Y. 1982) (common herbicide used by military as a "weapon of war").

The defense should apply to all three because all three have in common the unique military nature or military use of the product, which is the conceptual foundation underlying the government contract defense.

Of particular importance is the third type of product, for here the contractor has no control whatsoever over the government's use and adaptation of its product. If the Army decided to use Chevrolets, for example, in a jungle area with no roads, a contractor could neither anticipate nor control such a decision. By making a decision to use the Chevrolets in a "non-commercial" context, the military has identified a use peculiar to it. Under the separation of powers doctrine, the reasonableness of this determination should not be examined by the judiciary.

Moreover, viewing these three categories in light of the *McKay* test highlights the inadequacies of that version of the defense. *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984). Not only would *McKay* require judicial second-guessing of military decisions, but arguably it would not protect a contractor where the product was designed for commercial use and then used by the government for unique military purposes which the contractor could neither anticipate nor control.

3. *The Defense Should Apply Regardless of the Plaintiff's Civilian or Military Status*

A third issue raised by the Court at oral argument was whether the defense should apply without regard to the status of the plaintiff. Under the first element of the *McKay* test, the defense applies only if the plaintiff is barred from suing the government under *Feres*, i.e., if the plaintiff is in the military and the injury occurred incident to military service. *Amicus curiae* contend that this element of *McKay* misinterprets the underlying basis for the defense, lacks a rational basis, and unduly restricts application of the defense.

The underlying basis for the government contract defense is *not* the notion that a contractor should share in the government's sovereign immunity. Rather, the defense is rooted in the doctrine of separation of powers: the judiciary is not competent to second-guess military decisions regarding equipping and training of the armed forces. The defense is the mechanism by which the courts can avoid interfering with military deliberations. Thus, adherence to the separation of powers doctrine requires the judiciary to focus on the *product*, not the plaintiff, for it is the product which invokes the decision made by the military. *E.g.*, *In re Air Crash Disaster at Mannheim Germany*, 769 F.2d at 121 ("[t]he separation of powers principle that bars judicial second-

guessing of military judgments applies, *regardless of the status of the plaintiffs*, wherever recovery is sought for an alleged defect in a product designed for military use") (emphasis added); *see generally The Paquete Habana*, 189 U.S. 453, 464 (1903) (whether or not a claim can be made against the United States, the United States had adopted the acts of the alleged wrongdoers and had "made those acts its own").

The first element of the *McKay* test also lacks a rational basis. To allow the defense only when the plaintiff was injured incident to military service results in an inconsistent application of the law; the status of the injured person is an incidental and random fact unrelated to the design and use of the product.

Finally, to restrict the defense to military plaintiffs unduly limits its application and unjustly penalizes a contractor for something over which it has no control: who will be exposed to the military equipment. In *Mannheim*, for example, the military aircraft was used to transport civilians and enlisted personnel. The contractor had no control over who would be in the aircraft; the military chose to use the aircraft in that fashion. Thus, *amicus curiae* suggest that the Court fashion a government contract defense which will focus on the nature of the product and its use and not the plaintiff.

4. *Beech Aircraft Corp. v. Rainey*

There is currently a case pending before the Court which is closely related to the government contract defense: *Beech Aircraft Corp. v. Rainey*, 827 F.2d 1498 (11th Cir. 1987), *cert. granted*, 56 U.S.L.W. 3590 (U.S. Feb. 29, 1988) (No. 87-981 et al.). The facts in *Beech*, as in *Boyle*, are directly related to the military and its decision-making processes. Nowhere, however, do the parties in *Beech* or even the Eleventh Circuit acknowledge the military nature of the case and its impact on the Court's consideration.

In *Beech* the Court will address two evidentiary questions. First, the Court must determine whether, in a report prepared by a military officer, the evaluative conclusions constitute "factual findings" as expressed in Fed. R. Evid. 803(8)(c). This inquiry will necessarily involve separation of powers issues. Second, in *Beech* the Court must determine whether under Fed. R. Evid. 106 a military officer may testify as to his opinion regarding the cause of an accident. This question confronts the prohibition against military officers second-guessing their superiors, as expressed in *Feres* and *Stencel*. *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666, 673, *reh'g denied*, 434 U.S. 882 (1977); *Feres v. United States*, 340 U.S. 135 (1950); *see also United States v. Johnson*, 107 S. Ct. 2063 (1987).

Thus, in *Beech* the Court will be to a great extent considering many of the same fundamental principles as in *Boyle*. Consequently, the *Beech* case highlights the potential impact of the Court's formulation of a government contract defense.

CONCLUSION

Amicus curiae respectfully request this Court to fashion a government contract defense which is based on federal common law and which has broad application to include first, any type of product affected by a military decision; and second, suits by civilian plaintiffs.

Amicus curiae submit that the cases in which the defense arises are easily distinguishable from commercial product tort cases. In every commercial case, the company that procured the product which injured the plaintiff would be a party. In military cases, the United States is not only removed from the suit, but takes with it vital information about the military nature of the product, its use, and how decisions regarding its use were made. This phenomenon underscores the importance

and need for a viable government contract defense that adequately protects the government contractor, while upholding the constitutional mandate of separation of powers.

Respectfully submitted,

HERBERT L. FENSTER

Counsel of Record

RAYMOND B. BIAGINI

CHARLOTTE D. YOUNG

McKENNA, CONNER & CUNEO

1575 Eye Street, N.W.

Washington, D.C. 20005

(202) 789-7500

Attorneys for the Amicus Curiae

Of Counsel:

ROBIN S. CONRAD

NATIONAL CHAMBER

LITIGATION CENTER, INC.

1615 H Street, N.W.

Washington, D.C. 20062

(202) 463-5337

April 13, 1988

SUPPLEMENTAL BRIEF

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IN THE
Supreme Court of the United States

OCTOBER TERM, 1987

DELBERT BOYLE, Personal Representative Of The
Heirs and Estate of David A. Boyle, Deceased,
Petitioner,
v.

UNITED TECHNOLOGIES CORPORATION,
Respondent.

On Writ of Certiorari to the United States Court
of Appeals for the Fourth Circuit

**SUPPLEMENTAL BRIEF FOR
THE RESPONDENT ON REARGUMENT**

LEWIS T. BOOKER
(Counsel of Record)
RICHARD H. BURTON
LONNIE D. NUNLEY, III
HUNTON & WILLIAMS
707 East Main Street
Post Office Box 1535
Richmond, Virginia 23212
(804) 788-8200

Counsel for Respondent

Of Counsel:

PHILIP A. LACOVARA
MARK A. DOMBROFF
WILLIAM R. STEIN
WILLIAM R. MAGUIRE
HUGHES HUBBARD & REED
1201 Pennsylvania Avenue, N.W.
Washington, D.C. 20004
(202) 626-6200

W. STANFIELD JOHNSON
CROWELL & MORING
1001 Pennsylvania Avenue, N.W.
Washington, D.C. 20004
(202) 624-2500

April 13, 1988

RULE 28.1 LISTING

A Rule 28.1 Listing was previously made on behalf of respondent United Technologies Corporation in the Brief for the Respondent, filed May 21, 1987.

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SUPPLEMENTAL BRIEF FOR
THE RESPONDENT ON REARGUMENT

At the initial oral argument on October 13, 1987, members of the Court questioned (1) whether the "military contractor defense" should be governed by federal or state law, and (2) whether the courts should defer to Congress in fashioning the defense. We respectfully suggest that those issues are not properly before the Court.¹ Nevertheless, this Supplemental Brief addresses them.

I. THE MILITARY CONTRACTOR DEFENSE EXISTS
AS A MATTER OF FEDERAL LAW.

The constitutional allocation of powers between the national government and the states, as embodied in the Supremacy Clause, U.S. Const. Art. VI, cl. 2, requires that matters of a uniquely federal character be governed by federal law. *See, e.g., Clearfield Trust Co. v. United States*, 318 U.S. 363 (1943). Under this central principle of federalism, the use of state tort law to regulate military design determinations would impermissibly encroach upon an area that is exclusively reserved to the

¹ In the court of appeals, petitioner never challenged the existence of the military contractor defense, but rather argued only that respondent ("Sikorsky") had not met its burden of proving the defense. Brief of Appellee at 9-14. Similarly, in his petition for certiorari, he assumed that the defense exists as a matter of federal law, phrasing the principal question as:

"In light of the conflicting definitions of the 'government contractor defense' in the various circuits, what are the factual tests for the government contractor defense to be uniformly applied in all circuits?"

Petitioner's briefs before this Court were limited in the same way, and his counsel conceded at oral argument that federal law was the source of the defense. Tr. at 11-12. Accordingly, under Supreme Court Rule 21.1(a), the question whether the defense should be recognized at all as a matter of federal law is not properly before the Court. *See e.g., EEOC v. Shell Oil Co.*, 466 U.S. 54, 66 & n.17 (1984); *Mt. Healthy City School District Bd. of Ed. v. Doyle*, 429 U.S. 274, 278-79 (1977).

federal government and is imbued with uniquely federal interests. It is a constitutional imperative, therefore, that federal courts, through the application of federal law, foreclose state intrusion into federal military design decisions.

A. Federal Courts Have Repeatedly Recognized "Federal Common Law" Defenses In Areas Of Uniquely Federal Interest.

1. It is wrong to suggest, as certain *amici* have done, that recognizing a federal military contractor defense would somehow "overrule" *Erie Railroad Co. v. Tompkins*, 304 U.S. 64 (1938). The decision in *Erie* established that federal courts do not derive power to create rules of decision for private controversies merely because the diversity clause confers jurisdiction to decide those controversies. The *Erie* doctrine, however, simply restores the federal balance ordained by the Constitution, and does not "bring within the governance of state law matters exclusively federal . . . or . . . vitally affecting interests, powers and relations of the Federal Government" *United States v. Standard Oil Co.*, 332 U.S. 301, 307 (1947). Thus, even after *Erie*, the

"federal judicial power to deal with common-law problems . . . remained unimpaired for dealing independently, wherever necessary or appropriate, with essentially federal matters, even though Congress has not acted affirmatively about the specific question." *Id.*

As if to illustrate this important distinction, the Court held in a case decided the same day as *Erie* that federal common law applied to a dispute between private parties regarding water rights on an interstate stream. *Hinderlider v. LaPlata River Co.*, 304 U.S. 92, 110 (1938). To this day, the Court has continued to recognize the power and the duty of federal courts to fashion federal common law where necessary to protect important federal interests. See, e.g., *Clearfield Trust Co. v. United States*, *supra* (government's rights and duties under federal commercial paper governed by fed-

eral law); *United States v. Allegheny County*, 322 U.S. 174, 183 (1944) (federal procurement policies control question regarding defense contractor's state tax liability); *Westfall v. Erwin*, 484 U.S. —, 98 L.Ed.2d 619 (No. 86-714) (1988) (immunity of federal officials in state tort actions is a matter of federal law).

Recognizing the military contractor defense as part of federal common law simply acknowledges that the federal courts have ample power to fashion federal law to govern disputes that implicate primarily national interests, even where the "authority for a federal rule is not explicitly or clearly found in federal statutory or constitutional command." P. Bator, D. Mishkin, D. Shapiro & H. Wechsler, *Hart & Wechsler's the Federal Courts and the Federal System* 770 (2d ed. 1973).

2. Of course, given the limited nature of federal judicial jurisdiction, federal courts are understandably reluctant to create federal common law rights of action and liabilities, since recognizing a federal claim automatically expands the subject-matter jurisdiction of the federal courts. *Jackson Transit Authority v. Transit Union*, 457 U.S. 15, 30 (1982). See *United States v. Standard Oil Co.*, *supra*; *In re "Agent Orange" Product Liability Litigation*, 635 F.2d 987 (2d Cir. 1980), *cert. denied*, 454 U.S. 1128 (1981). Judicial creation of a federal cause of action, however, is a far cry from recognizing a federal defense—applicable in federal or state proceedings—that is necessary to protect important federal interests from the vagaries of state-imposed liabilities. The fact that a plaintiff's claim "arises under state law . . . does not preclude the formulation of a federal defense in cases raising issues of uniquely federal concern," *Bynum v. FMC Corp.*, 770 F.2d 556, 567 (5th Cir. 1985).²

² Recognizing a federal defense does not expand federal court jurisdiction. See *Caterpillar, Inc. v. Williams*, 482 U.S. —, 96 L.Ed.2d 318 (1987); *Phillips Petroleum Co. v. Texaco, Inc.*, 415 U.S. 125 (1974).

For example, both of the seminal post-*Erie* "federal common law" cases, *Clearfield Trust, supra*, and *D'Oench, Duhme & Co. v. FDIC*, 315 U.S. 447 (1942), concluded that federal common law, not state law, must govern the defense of estoppel in claims based on federal commercial paper, since there is a "uniquely federal interest" in forming the law of governmental financial obligations. See also *Aitken v. IP & GCU-Employer Retirement Fund*, 604 F.2d 1261, 1264, 1269 (9th Cir. 1979) (federal law rather than state law governs the estoppel defense in actions under state law against pension funds, even before congressional intervention under ERISA).

In other contexts as well this Court has recognized federal defenses that "may reshape the common-law landscape" of state tort law. *Philadelphia Newspapers, Inc. v. Hepps*, 475 U.S. 767, 775 (1986). Thus, for example, the Court recently held that the overriding federal interest in protecting freedom of speech may preclude liability under the newly created tort of "intentional infliction of emotional harm." *Hustler Magazine v. Falwell*, — U.S. —, 108 S. Ct. 876 (No. 86-1278) (1988). *Accord NAACP v. Claiborne Hardware Co.*, 458 U.S. 886 (1982) (tortious interference with trade or business); *New York Times Co. v. Sullivan*, 376 U.S. 254 (1964) (libel). See also *Farmers Educ. & Coop. Union of America v. WDAY, Inc.*, 360 U.S. 525 (1959) (federal prohibition against censorship by broadcasters of political messages broadcast under "equal time" rule gives rise to a federal defense to libel actions under state law).

Earlier this Term, in *Westfall v. Erwin, supra*, the Court reaffirmed that federal official immunity as a defense to state tort liability "is a matter of federal law, 'to be formulated by the courts in the absence of legislative action by Congress.'" 98 L.Ed.2d at 625, quoting *Howard v. Lyons*, 360 U.S. 593, 597 (1959); see *Barr v. Mateo*, 360 U.S. 564 (1959). See also *Nixon v. Fitzgerald*, 457 U.S. 731, 749 (1982) (presidential immunity rooted in separation of powers). Similarly, in *Banco*

Nacional de Cuba v. Sabbatino, 376 U.S. 398, 423 (1964), a diversity case, the Court recognized the Act of State doctrine as a federal defense to state-created liabilities. Relying on the "uniquely federal" nature of foreign affairs problems and the constitutional delegation of foreign affairs functions to the executive branch, the Court explained that

"an issue concerned with a basic choice regarding the competence and function of the Judiciary and the National Executive in ordering our relationships with other members of the international community must be treated exclusively as an aspect of federal law."

376 U.S. at 425. See also *First National City Bank v. Banco Nacional de Cuba*, 406 U.S. 759, 765 (1972); *Alfred Dunhill of London, Inc. v. Republic of Cuba*, 425 U.S. 682, 697 (1976).

The constitutional underpinning of these cases is essentially that of preemption under the Supremacy Clause. The authority of the states to create and impose liability must yield when that authority collides with discernible federal policies. See *United States v. Kimbell Foods, Inc.*, 440 U.S. 715, 728 (1979). Even where a federal statute does not specifically address a precise issue, state law must give way to federal interests in areas where applying state law would "stand as an obstacle to the accomplishment" of federal law or policy. *Ray v. Atlantic Richfield Co.*, 435 U.S. 151, 158 (1978); *Fidelity Federal Savings & Loan Ass'n v. De La Cuesta*, 458 U.S. 141 (1982). See, e.g., *Farmers Educ. & Coop. Union v. WDAY, Inc., supra*, 360 U.S. at 535.

3. To be sure, some of these federal defenses are designed to vindicate specific constitutional or statutory provisions. See, e.g., *NAACP v. Claiborne Hardware Co., supra*; *Farmers Educ. & Coop. Union v. WDAY, Inc., supra*. In many cases, however, there were no specific textual bases for the defenses. For example, in the official immunity cases, the Court has formulated a fed-

eral defense to state-created liability based not on a specific statute or constitutional clause, but on the "peculiarly federal concern," *Howard v. Lyons*, *supra*, 360 U.S. at 597, in "insulat[ing] the [governmental] decisionmaking process from the harassment of prospective litigation," *Westfall*, 98 L.Ed.2d at 625.

Similarly, the Act of State defense, which is "binding on federal and state courts alike," is "compelled by neither international law nor the Constitution" nor a federal statute. *Sabbatino*, 376 U.S. at 427. Rather, the defense finds more diffuse but nevertheless discernible support—"underpinnings," 376 U.S. at 423—in the interplay of various constitutional and statutory provisions and in the important federal policies reflected in them. See, e.g., *Sabbatino*, 376 U.S. at 427 n.25. See also, e.g., *D'Oench, Duhme & Co. v. FDIC*, *supra*, 315 U.S. at 465-75 (federal common law of governmental commercial paper derived from policies of National Banking Act and Federal Reserve Act).

Of course, federal common law defenses may be necessary even when the dispute is between private parties. See, e.g., *Hinderlider v. LaPlata River Co.*, *supra*; *Banco Nacional de Cuba v. Sabbatino*, *supra*; *American Pipe & Steel Corp. v. Firestone Tire & Rubber Co.*, 292 F.2d 640 (9th Cir. 1961). The crucial inquiry is whether resolution of the underlying issues will "involve the duties of the Federal Government, the distribution of powers in our federal system, or matters necessarily subject to federal control even in the absence of statutory authority." *Texas Industries, Inc. v. Radcliffe Materials, Inc.*, 451 U.S. 630, 642 (1981).

Thus, it is now well-settled that, despite *Erie*, it is "precisely when Congress has not spoken" in an area of important and palpable federal concern "that *Clearfield* directs federal courts to fill the interstices of federal legislation 'according to their own standards.'" *United States v. Kimbell Foods, Inc.*, *supra*, 440 U.S. at 727, quoting *Clearfield Trust*, 318 U.S. at 367.

B. The Military Contractor Defense Is Necessary To Protect Uniquely Federal Interests.

1. The circumstances under which a military contractor may be liable for the design of military weapons and equipment is an issue of special federal concern. Under the Constitution, protecting the national defense and conducting war are the exclusive province of the federal government. U.S. Const. Art. I, § 8, cls. 11-14; Art. II, § 2, cl. 1; *Schlesinger v. Ballard*, 419 U.S. 498, 510 (1975); *U.S. ex rel. Toth v. Quarles*, 350 U.S. 11, 17 (1955). See also *Orloff v. Willoughby*, 345 U.S. 83, 94 (1953). The responsibility for determining how the military will conduct its business rests solely with the federal government. *Schlesinger v. Ballard*, *supra*, 419 U.S. at 510. Undeniably, the composition, training, equipping and management of the military are the concern of the federal government alone and "implicate[] uniquely federal interests of the most basic sort." *Bynum v. FMC Corp.*, *supra*, 770 F.2d at 569.

The Court already has decided that federal law must govern the distinctly federal relationship between the United States and its suppliers of ordnance. E.g., *Stencel Aero Engineering Corp. v. United States*, 431 U.S. 666 (1977). See also *United States v. Standard Oil Co.*, *supra*. The common law applicable to military procurement contracts is exclusively federal. See *United States v. Seckinger*, 397 U.S. 203, 209-10 (1970); *United States v. Allegheny County*, *supra*. Federal common law even extends to many aspects of the contractual relationship between a defense contractor and its subcontractors. See, e.g., *American Pipe & Steel Corporation v. Firestone Tire & Rubber Company*, *supra*, 292 F.2d at 643; *United States v. Taylor*, 333 F.2d 633, on rehearing, 336 F.2d 149 (5th Cir. 1964); *Grinnell Fire Protection Systems Co., Inc. v. Regents of the University of California*, 554 F. Supp. 495 (N.D. Cal. 1982). It would be bizarre to rule that there is a weaker federal interest in defining the obligations of a military contractor to a Marine

pilot for supplying weapons systems to the Navy in accordance with the Navy's specifications. As the Court explained in *Allegheny County*, in holding that state tax characterizations could not apply to a military contract, the "validity and construction of contracts through which the United States is exercising its constitutional functions, their consequences on the rights and obligations of the parties . . . present questions of federal law not controlled by the law of any state." 322 U.S. at 182. See *United States v. Little Lake Misere Land Co.*, 412 U.S. 580, 592-93 (1973) (state law cannot "govern of its own force" activities "arising from and bearing heavily upon a federal . . . program"); *Public Utilities Comm'n v. United States*, 355 U.S. 534 (1958) (state regulation may not interfere with federal procurement process).

2. As the Court has recognized, state regulation can be as effectively exerted through an action for damages as through formal statutes or regulations. See, e.g., *San Diego Building Trades Council v. Garmon*, 359 U.S. 236, 246 (1959). "The obligation to pay compensation can be, indeed is designed to be, a patent method of governing conduct and controlling policy." *Id.* at 247. See also *NAACP v. Claiborne Hardware Co.*, *supra*, 458 U.S. at 916-20. Thus, if states, through the medium of their tort law, were permitted to pass upon the adequacy of military design decisions, they would unduly interfere with vital federal interests. It is necessary, therefore, to fashion a rule of federal law adequate to protect those federal interests from state regulation.

In *Westfall*, 98 L.Ed.2d at 625, the Court recently explained that immunity from state tort liability must be recognized when it is functionally necessary to do so in order to protect federal governmental processes from the "harassment of prospective litigation." For similar reasons, in *United States v. Stanley*, 483 U.S. —, 97 L.Ed.2d 550, 566 (1987); *United States v. Shearer*, 473 U.S. 52, 58-59 (1985); *Stencel Aero Engineering Corporation v. United States*, *supra*, 431 U.S. at 673; and *Feres v. United States*, 340 U.S. 135 (1950), the Court

upheld other types of defenses in order to minimize the impact on military processes and military discipline that would result from litigation concerning injuries sustained by soldiers incident to military service. See also *Chappel v. Wallace*, 462 U.S. 296 (1983).

Just as in those cases, a tort action challenging the government-approved design of military equipment as "negligent" or "unreasonably dangerous" would impermissibly "involve second-guessing military orders, and would often require members of the Armed Services to testify in court as to each other's decisions and actions." *Stencel*, 431 U.S. at 673. Whether the suit is against the government directly or against the military contractor retained by the government, therefore, "a suit based upon service-related activity necessarily implicates the military judgments and decisions that are inextricably intertwined with the conduct of a military mission." *United States v. Johnson*, 481 U.S. —, 95 L.Ed.2d 648, 659 (1987) (footnote omitted).³ Since civilian contractors work closely with military personnel in developing military design and play an integral role in military affairs, "an inquiry into the civilian activities" in a design defect action against a military contractor "would have the same effect on military discipline as a direct inquiry into military judgments." *Id.* at 659 n.11. See *Tozer v. LTV Corp.*, 792 F.2d 403, 406 (4th Cir. 1986), *petition for cert. pending*, No. 86-674 (filed Oct. 23, 1986).

In this case, for example, the Navy assisted in, reviewed, and approved all aspects of the design of the escape hatch of the CH-53D helicopter, including the design concept, the general and detailed design specifications, the design drawings, the prototype, the flight testing, and even the operational manuals. Brief for Re-

³ See, e.g., *In re "Agent Orange" Product Liability Litigation*, 818 F.2d 187, 191 (2d Cir. 1987), *petition for cert. pending*, No. 87-436 (filed Sept. 15, 1987); *Bynum v. FMC Corp.*, *supra*, 770 F.2d at 505; *McKay v. Rockwell Int'l Corp.*, 704 F.2d 444, 449 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984).

spondent at 2-4. Thus, the functional concerns about litigation-related interference with governmental processes that underlie the *Barr-Westfall* immunity and the *Feres-Stencel* defense equally justify recognizing the military contractor defense as a matter of federal law.

3. Quite apart from avoiding intrusion into command decisions, there is another functional basis for recognizing the military contractor defense. As the Solicitor General emphasizes, this defense is essential to the effective functioning of the military procurement process. Brief for the United States as *Amicus Curiae* at 10 ff. Military designs, which balance safety against performance, cost, and expedition, and which may be on the cutting edge of technology, often assume risks far beyond those ordinarily acceptable in civilian society. See, e.g., *Bynum v. FMC Corp.*, *supra*, 770 F.2d at 569. Judges and juries, however, might "demand extensive safety testing" that would "impose costs and delays inconsistent with military imperatives." *In re "Agent Orange" Product Liability Litigation*, *supra*, 818 F.2d at 191. In supporting this defense, the government recognizes that judicial second-guessing of military design determinations would induce military contractors to minimize their exposure under state law by deferring to safety considerations at the expense of military effectiveness. See, e.g., *Bynum v. FMC Corp.*, *supra*, 770 F.2d at 566; *McKay v. Rockwell Int'l Corp.*, *supra*, 704 F.2d at 449-50.

The Solicitor General also properly stresses that contractor expertise and participation in design are essential to developing a technologically advanced and competitively equipped military. Brief for United States as *Amicus Curiae* at 12-13. The spectre of liability for participating in the design process, however, would cause contractors to be passive in simply carrying out governmental specifications (in the hope of invoking the defense set forth in *Yearsley v. W.A. Ross Construction Co.*, 309 U.S. 18 (1940)), rather than to cooperate actively in the design process. See *Tozer v. LTV Corp.*,

supra, 792 F.2d at 407; *Koutsoubos v. Boeing Vertol, Div. of Boeing Co.*, 755 F.2d 352, 355 (3d Cir.), *cert. denied*, 474 U.S. 821 (1985).

As this Court long ago recognized in holding unconstitutional a state court's attempt to pass upon the enlistment of a military serviceman, "[n]o interference with the execution of [the] power of the National Government in the formation, organization and government of its armies by any State officials could be permitted without greatly impairing the efficiency, if it did not utterly destroy, this branch of the public service." *Tarble's Case*, 80 U.S. (13 Wall.) 397, 408 (1872). This perception is no less true today, see *Gilligan v. Morgan*, 413 U.S. 1 (1973), and requires recognition of a military contractor defense as a matter of federal law.

4. The functional bases for the federal military contractor defense have important and unmistakable constitutional dimensions. A principal purpose of the defense is, like the Act of State doctrine, to reflect a "basic choice regarding the competence and function of the Judiciary and the National Executive" and to assure the "proper distribution of functions between the judicial and political branches of the [federal] Government." *Sabbatino*, 376 U.S. at 425, 427-28. See *In re "Agent Orange" Product Liability Litigation*, *supra*, 818 F.2d at 191. Military design judgments are not proper grist for the judicial mill, federal or state. Thus, it would be especially improper to permit the military contractor defense, which is "rooted in separation of powers concerns" about the proper ordering of relationships among branches of the federal government, to be "frustrated by the application of state law and policies" or "left to divergent and parochial state interpretations." *Bynum v. FMC Corp.*, *supra*, 770 F.2d at 570, quoting *Sabbatino*, 376 U.S. at 425.

Furthermore, the overriding federal interest in the relationship between military contractors and members of the military requires that a uniform federal rule govern this relationship. As Commander-in-Chief, the President

sends military personnel across the nation and around the world. There is no reason why the law applicable to the relationships among servicemen, the government, and military contractors should vary "in accordance with the different rulings of the several states, simply because the soldier marches or today perhaps as often flies across state lines." *Standard Oil*, 332 U.S. at 310; see *Stencel*, 431 U.S. at 672. Thus, for example, if the two crewmembers of a disabled Navy attack bomber eject and land on either side of the Georgia-Florida border, there would be no sense in applying a different state law to each pilot's claim that the bomber's design was flawed. See *Feres*, 340 U.S. at 143.⁴

In fact, many suits by servicemen against military contractors arise under federal law, such as the Death On The High Seas Act, 46 U.S.C. §§ 761 *et seq.*, or other

⁴ As a matter of traditional choice-of-law analysis, a state usually has little or no interest in applying its law to an action between a transitory serviceman—in this case, a Marine carrier pilot—and a military contractor. The serviceman is unlikely to be a domiciliary of the state, and, because the military provides for his upkeep and medical care, the state has no welfare interest in assuring that he is compensated. Indeed, most states that have considered the military contractor defense have recognized the predominantly federal nature of the relationship and adopted the defense. See, e.g., *Tillet v. J.I. Case Co.*, 756 F.2d 591 (7th Cir. 1985) (Wisconsin law); *Dorse v. Armstrong World Industries, Inc.*, 513 So.2d 1265 (Fla. 1987) (on certified questions from 798 F.2d 1372 (11th Cir. 1986); opinion after response at 837 F.2d 957 (11th Cir. 1988); *Mackey v. Maremont Corp.*, 350 Pa. Super. 415, 504 A.2d 908 (1986); *McLaughlin v. Sikorsky Aircraft*, 148 Cal.App.3d 203, 195 Cal.Rptr. 764 (1983); *Hammond v. North American Asbestos Corp.*, 105 Ill.App.3d 1033, 435 N.E.2d 540 (1982), *aff'd*, 97 Ill.2d 195, 454 N.E.2d 210 (1983); *Hunt v. Blasius*, 55 Ill.App.3d 14, 370 N.E.2d 617 (1977), *aff'd*, 74 Ill.2d 203, 384 N.E.2d 368 (1978); *Casabianca v. Casabianca*, 104 Misc.2d 348, 428 N.Y.S.2d 400 (Sup. Ct. 1980); *Sanner v. Ford Motor Company*, 144 N.J. Super. 1, 364 A.2d 43 (Law Div. 1976), *aff'd*, 154 N.J. Super. 407, 381 A.2d 805 (App. Div. 1977), *certification denied*, 75 N.J. 616, 384 A.2d 846 (1978). State courts, however, do not always apply the defense. See, e.g., *Hansen v. Johns-Manville Corp.*, 734 F.2d 1036 (5th Cir. 1984), *cert. denied*, 470 U.S. 1051 (1985) (Texas law); *Norbriga v. Raybestos-Manhattan, Inc.*, 67 Haw. 157, 683 P.2d 389 (1984).

aspects of admiralty law. Federal law unquestionably controls the military contractor defense in such cases. No policy would be served by providing a federal defense to military contractors in federal cases, but allowing the states to control the outcome in other cases simply because the injury occurs within a state's borders. Thus, to take the attack bomber hypothetical discussed above, there is no legitimate rationale for applying federal law to the ejecting pilot's claim if he lands more than three miles offshore and thus becomes subject to the Death On The High Seas Act, and applying state law to the copilot's claim if he lands only two-and-a-half miles offshore and thus is subject to state law. If that were the case, the application of state law would, as in *Clearfield Trust*, produce "great diversity in results by making identical transactions subject to the vagaries of the laws of the several states." 318 U.S. at 367.⁵

5. Finally, as numerous courts have found and as the Solicitor General warns, potentially vast and open-ended military contractor liability would be reflected in cost overruns or increased liability-insurance pass-through in current military contracts, or in higher prices for future military equipment. See, e.g., Brief for the United States as *Amicus Curiae* at 16; *In re "Agent Orange" Product Liability Litigation*, *supra*, 818 F.2d at 191; *Bynum v. FMC Corp.*, *supra*, 770 F.2d at 566; *McKay v. Rockwell Int'l Corp.*, *supra*, 704 F.2d at 449; see also *Stencel*, 431 U.S. at 672-73; *Clearfield Trust Co.*, 318 U.S. at 366-67. This indirect assault on the federal treasury would circumvent the structure erected by Con-

⁵ The overriding national interest in defense policy and military effectiveness distinguishes this case from, for example, cases like *United States v. Kimbell Foods, Inc.*, *supra*, *Miree v. DeKalb County*, 433 U.S. 25 (1977), and *Wallis v. Pan American Petroleum Corp.*, 384 U.S. 63 (1966). Those cases involved federal programs tied to state law and operating on a local or regional level, or addressed issues involving only a tenuous federal interest. The Court thus decided to adopt state law as the federal rule of decision because the application of varying state law would not hamper federal interests. See *Kimbell Foods*, 440 U.S. at 730-32.

gress and this Court to govern compensation for servicemen injured in service-connected accidents. Congress has ordained that veterans' statutory benefits, *see, e.g.*, 10 U.S.C. §§ 1475 *et seq.*; 38 U.S.C. §§ 101 *et seq.*, be the "sole-remedy for service-connected injuries." *United States v. Johnson*, *supra*, 95 L.Ed.2d at 658; *Stencel*, 431 U.S. at 673; *Feres*, 340 U.S. at 142. The federal government and its officials are immune from direct liability for injuries sustained by active duty servicemen. *See Feres v. United States*, *supra*; *Stencel Aero Engineering Corp. v. United States*, *supra*; *United States v. Stanley*, *supra*. Subjecting military contractors to state-created tort liability for design decisions would, by virtue of the almost certain pass-through of such costs, "judicially admit at the back door that which has been legislatively [and judicially] turned away at the front door." *Stencel*, 431 U.S. at 673, *quoting Laird v. Nelms*, 406 U.S. 797, 802 (1972).

II. THE COURT CAN RECOGNIZE AND DEFINE THE MILITARY CONTRACTOR DEFENSE WITHOUT DIRECT CONGRESSIONAL ACTION.

The question also has arisen whether the Court should defer to Congress in fashioning the military contractor defense. Judicial inaction in this case, however, would disserve the separation of powers because it would allow courts and juries to superimpose *their* views on military design judgments that are properly left to the political branches.

A. Failure To Recognize The Military Contractor Defense Would Entangle The Courts In Executive Functions.

1. The courts wisely refrain from reexamining decisions made by the executive branch in pursuing our national defense or foreign affairs. As the Court explained:

"Such decisions are wholly confided by our Constitution to the political departments of the government, Executive and Legislative. They are delicate, complex, and involve large elements of prophecy. They are and should be undertaken only by those directly

responsible to the people whose welfare they advance or imperil." *Chicago & Southern Air Lines, Inc. v. Waterman Steamship Corp.*, 333 U.S. 103, 111 (1948).

Indeed, these are the concerns that motivated the recognition of the Act of State doctrine as a defense to federal or state law claims that would require the courts to address sensitive foreign affairs issues. *Sabbatino*, 376 U.S. at 428. *See also Zschernig v. Miller*, 389 U.S. 429, 440 (1968).

For these reasons, as the Court recently observed, "unless Congress specifically has provided otherwise, courts traditionally have been reluctant to intrude upon the authority of the Executive in military and national security affairs." *Department of the Navy v. Egan*, — U.S. —, 98 L.Ed.2d 918 (No. 86-1552) (1988). Emphasizing that "judges are not given the task of running the Army," the Court has admonished:

"Orderly government requires that the judiciary be as scrupulous not to interfere with legitimate Army matters as the Army must be scrupulous not to intervene in judicial matters." *Orloff v. Willoughby*, *supra*, 345 U.S. at 93.

Similarly, the Court has foreclosed judicial review of the conduct of superior officers because it would undermine military effectiveness. *Chappell v. Wallace*, *supra*.

The need to avoid judicial intrusion into military affairs is the principal basis for the decision in *Feres* nearly forty years ago, and for the application of that doctrine in *Stencel*, *Stanley*, *Johnson* and *Shearer*. *See United States v. Shearer*, *supra*, 473 U.S. at 57-58. The Court has consistently cautioned against entertaining "the type of claims that, if generally permitted, would involve the judiciary in sensitive military affairs at the expense of military discipline and effectiveness." *Id.* at 59 (original emphasis). "The danger is in allowing a civilian court to second-guess military decisions" *Id.* at 57 (citations omitted). The *Feres* doctrine, there-

fore, is "not a matter of personal immunity," but "has far more to do with the proper relation between the courts, Congress and the military than it has to do with individual defendants." *Stauber v. Cline*, 837 F.2d 395, 399 (9th Cir. 1988). It is "a judicial doctrine leaving matters incident to service to the military, in the absence of congressional direction to the contrary." *Id.*

2. These separation-of-powers concerns explain why, even in the absence of specific congressional action, courts and juries must defer to the special competence of the executive in the design of military equipment:

"Trained professionals, subject to the day-to-day control of responsible civilian authorities, necessarily must make comparative judgments of the merits as to evolving methods of training, equipping, and controlling military forces with respect to their duties under the Constitution.

* * *

"Moreover, it is difficult to conceive of an area of governmental activity in which the courts have less competence. The complex, subtle, and professional decisions as to the composition, training, equipping, and control of a military force are essentially professional military judgments, subject *always* to civilian control of the Legislative and Executive Branches." *Gilligan v. Morgan*, *supra*, 413 U.S. at 8, 10 (emphasis added).

The military contractor defense is a corollary of these principles. As the Florida Supreme Court recently held, "the federal war-making and defense power, which the Constitution has entrusted exclusively to the president and Congress" means that, as a matter of federal law, "traditional separation of powers doctrine compels the defense." *Dorse v. Armstrong World Industries, Inc.*, *supra*, 513 So.2d at 1268, quoting *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736, 740 (11th Cir. 1985), petition for cert. pending, No. 85-1529 (filed March 17, 1986). Indeed, every federal court considering the question has concluded that "[s]ubjecting military contractors to full tort liability would inject the judicial branch

into political and military decisions that are beyond its constitutional authority and institutional competence." *In re "Agent Orange" Product Liability Litigation*, *supra*, 818 F.2d at 191. See, e.g., *Tozer v. LTV Corp.*, *supra*, 792 F.2d at 406 ("[c]ivilian scrutiny of [military design] decisions is generally exerted through executive and legislative oversight on behalf of the public at large, not, as here, through the judiciary at the behest of an individual serviceman").

Moreover, courts traditionally hesitate to act on issues where their determinations are prone to error. See, e.g., *United States v. Stanley*, *supra*, 97 L.Ed.2d at 566. See also *Chicago & Southern Air Lines, Inc. v. Waterman Steamship Corp.*, *supra*, 333 U.S. at 111-13; *In re Paris Air Crash*, 622 F.2d 1315, 1319 n.5 (9th Cir.), cert. denied, 449 U.S. 976 (1980). The federal executive, with literally thousands of professional specialists devoting their careers to these delicate issues, possesses special expertise in military affairs, including the design of suitable military equipment and weapons. The courts, by comparison, lack the expertise or resources to consider these questions, but in the absence of the military contractor defense they would be required to do so.

B. Abstention In The Absence Of Direct Congressional Action Is Not Appropriate.

In *Standard Oil*, the Court considered whether the government should be able to bring tort suits against private persons who injure soldiers. The Court held that the issue must be governed by federal law, but decided to defer to Congress on the question. Thus, the Court took the question out of the states' hands, and left the liability question to Congress. See also *United States v. Gilman*, 347 U.S. 507 (1954).

1. The abstention exhibited in *Standard Oil* is not appropriate in this case. In *Standard Oil*, the only question was "which organ of the [federal] Government" was "to make the determination that liability exist[ed]." 332

U.S. at 316. Because the Court had federalized the question, there was no danger of state judicial intervention in uniquely federal policy issues; no liability would be created in the absence of congressional action. *Id.* at 314-15.

By contrast, if this Court were to hold here that the existence of a military contractor *defense* is a matter of federal law but that it is up to Congress to fashion it, military contractors nevertheless would stand exposed to tort liability under state law unless and until Congress acted. This would require both federal and state courts to become entangled in military decision-making when they try to resolve servicemen's tort suits against military contractors, except to the extent that individual states choose to adopt a military contractor defense. Thus, abstention would leave the separation-of-powers problem to fester without relief.

Furthermore, in *Standard Oil*, the Court was asked to create a new cause of action and thus to enlarge federal judicial jurisdiction. Federal courts are properly reluctant to do so in the absence of congressional guidance. In formulating a federal *defense* applicable to military design decisions, however, the federal courts are simply exercising two justiciable obligations: first, under the Supremacy Clause, to assure that state law does not improperly encroach on the federal domain, and second, under separation-of-powers principles, to assure that the courts do not improperly interfere in matters committed to the elected branches.⁶

⁶ Congress has been aware that the lower federal courts unanimously have recognized the military contractor defense. Contrary to petitioner's claims, however, Congress has shown no inclination to disavow the defense. See Reply Brief for Petitioner at 4-6. Petitioner relies on Section 794 of the Department of Defense Appropriations Act, 1984, Pub.L. No. 98-212, 97 Stat. 1454 (1983). That statute has been repealed. Section 1234(b)(1) of the Defense Procurement Reform Act of 1984, Pub.L. No. 98-557, 98 Stat. 2601 (1984) (codified at 10 U.S.C. § 2403). Moreover, Section 794 simply

2. Another of the Court's concerns in *Standard Oil* was that creating the proposed new cause of action would have involved "a possible element of surprise, in view of the settled contrary practice." 332 U.S. at 316. See also *Texas Industries, Inc. v. Radcliffe Materials, Inc.*, *supra*, 451 U.S. at 634-35. By contrast, the military contractor defense is actually an outgrowth of common law principles. Although it implements constitutional principles of national supremacy and separation of powers, the defense is in effect an "amalgamation" of "two traditional defenses." *Bynum v. FMC Corp.*, *supra*, 770 F.2d at 565. First, it reflects the long-standing rule of *Yearsley v. W.A. Ross Construction Co.*, 309 U.S. 18 (1940), that a government contractor shares in the government's immunity when acting as its agent and carrying out government specifications. See, e.g., *Myers v. United States*, 323 F.2d 580 (9th Cir. 1963). Second, the defense finds roots in the old common law "contract specification defense," recognized by this Court in *United States v. Spearin*, 248 U.S. 132 (1918), that contractors generally will "not be liable for damages resulting from

required that military contractors guarantee that weapons systems are designed and manufactured to conform to contractual performance requirements, and did not address alleged "design defects" outside the scope of the specification requirements. Section 794, therefore, is irrelevant to military contractors' liability under state tort law to servicemen for service-connected injuries resulting from a government-approved design. If anything, Section 794, as well as the Defense Procurement Reform Act, show that Congress intends that military contractors' warranty liability be predicated on its federal contract, not state tort law.

Petitioner also points to H.R. 4083 and H.R. 4199, both of the 98th Cong., 2d Sess. (1984), and S. 1254, 99th Cong., 1st Sess. (1985), which would have amended the Federal Tort Claims Act to establish a new right of indemnification for government contractors and subcontractors. These bills did not address the military contractor defense and suffered from many other problems as well. See, e.g., *Brief of United States as Amicus Curiae* at 21-22 n.21. In any event, the bills failed in committee and thus are of no consequence here.

specifications provided by another," *Bynum v. FMC*, *supra*, 770 F.2d at 563.⁷

Moreover, far from being a surprising change in the law, the military contractor defense is a logical corollary of the principle applied in *Feres*, *Stanley* and other cases prohibiting soldiers from suing the government, military superiors, or civilian government employees for service-connected torts. The defense also draws upon the general common law principle that public servants who face hazards as part of their jobs are barred from suing for damages sustained in performing their duties. *See* Brief for Respondent at 29-30. The military contractor defense, therefore, is no more than another example of the legitimate and traditional role the courts play in shaping the outer limits of common law liability.

This Court, therefore should affirm the view—adopted by each of the circuits that has considered the question, as well as by many state courts—that separation of powers principles and other important federal policies require courts to refrain from examining the design decisions of military contractors, at least where the government is a substantial participant in the design process.

CONCLUSION

The judgment of the court of appeals should be affirmed.

Respectfully submitted.

Of Counsel:

PHILIP A. LACOVARA

MARK A. DOMBROFF

WILLIAM R. STEIN

WILLIAM R. MAGUIRE

HUGHES HUBBARD & REED

W. STANFIELD JOHNSON

CROWELL & MORING

LEWIS T. BOOKER

(*Counsel of Record*)

RICHARD H. BURTON

LONNIE D. NUNLEY, III

HUNTON & WILLIAMS

Counsel for Respondent

⁷ *See, e.g.*, Restatement (Second) of Torts, § 404 comment a (1965); *Ryan v. Feeney & Sheeham Building Co.*, 239 N.Y. 43, 145 N.E. 321 (1924). *See also In re "Agent Orange" Product Liability Litigation*, *supra*, 818 F.2d at 190-91.

SUPPLEMENTAL BRIEF

APR 13 1988

JOSEPH F. SPANIOLO, JR.
CLERK

No. 86-492

IN THE
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OCTOBER TERM, 1986

DELBERT BOYLE, personal representative of the
Heirs and Estate of David A. Boyle, deceased
Petitioner,

v.

UNITED TECHNOLOGIES CORP.,
Respondent.

**SUPPLEMENTAL BRIEF - AMICUS CURIAE
ON BEHALF OF JOAN S. TOZER, KATHERINE S.
TOZER AND LINDSAY M. TOZER**

MICHAEL J. PANGIA*
GILMAN, OLSON & PANGIA
Suite 600
1815 H Street, N.W.
Washington, D.C. 20006
(202) 466-5100

*Counsel of Record

IN THE
Supreme Court of the United States
OCTOBER TERM, 1986

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DELBERT BOYULE, personal representative of the
Heirs and Estate of David A. Boyle, deceased,
Petitioner,

v.

UNITED TECHNOLOGIES CORP.,
Respondent.

**SUPPLEMENTAL BRIEF OF AMICUS CURIAE
JOAN S. TOZER, ET AL.**

An *amicus curiae* brief on behalf of Joan Tozer, *et al.*,
was accepted by the Court. This supplemental brief has
been permitted pursuant to an order of this Court dated
March 7, 1988.

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STATEMENT

FEDERAL COMMON LAW SHOULD NOT BE FASHIONED TO PROTECT PRIVATE MANUFACTURERS FROM CONSEQUENCES OF THEIR NEGLIGENT DESIGN AND SALE OF MILITARY EQUIPMENT.

There is "no federal general common law." *Erie R. Co. v. Tompkins*, 304 U.S. 64, 78 (1938).

The instant case follows the case of *Tozer v. LTV, Corp.*, 792 F.2d 403 (4th Cir. 1986), *petition for cert. pending*, (Pet. 86-674), wherein the Fourth Circuit literally fashioned federal common law based upon the rationale in *McKay v. Rockwell International Corp.*, 704 F.2d 444 (9th Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984), and under a separation of powers theory. It appears that while the Fourth Circuit was conscious of a separation of powers, it violated those bounds by making unsupported socio-economic assumptions without the benefit of the detailed legislative process in order to fashion law to immunize private parties in their profit making ventures. Thus, these assumptions are made without evidentiary support, statistical data or careful analyses of conflicting theories.

The *McKay* court was fearful of the possibility that accountability for torts would have some type of a chilling effect on the duties of manufacturers. The *Tozer* court reemphasized this fear by stating that: "[p]ermitting recovery for design defects under any theory of liability risks altering the nature of the procurement process." The *Tozer* court continued that unless this defense was established, there would be a decrease in contractor participation in design and that an increase in the cost of military weaponry and

equipment would take place which would diminish efforts in contractor research and development. *Tozer*, 792 F.2d at 407.

As Judge Alarcon commented in his dissent in *McKay*, such conclusions are incorrect. *McKay*, 704 F.2d at 457, 458. Further, there was no evidence introduced in *Tozer*, and, to the knowledge of this *amicus*, no evidence introduced in any of the present government contractor cases supporting these assumptions. Significantly, when Congress studied the subject in 1984 and 1985, both the Departments of Justice and Defense offered testimony that the present system of accountability for tortious design was indeed necessary to encourage manufacturers to work more closely and conscientiously in their profit making endeavors. *Government Contractor's Product Liability and Indemnification Acts, 1977: Hearings on H.R. 4083 and H.R. 4199 Before the Subcomm. on Administrative Law and Governmental Relations of the House Comm. on the Judiciary, 98th Cong., 2d Sess. 50, 59-64 (1984); and, Hearings on S.1254 Before the Comm. on the Judiciary, 99th Cong., 1st Sess. 23, 30 (1985).* (Relevant portions contained in *Tozer amicus* brief)

The assumption that the present tort system would create an undesirable cost pass through to the taxpayers also has no evidentiary basis in any of the subject cases. The liability in *Tozer* was privately insured by the defendant. There was no evidence that the presence of insurance inflated the prices charged to the government or, more importantly, that the elimination of tort liability for design will affect overall unit costs in the future. There has been no judicial survey or study made on this issue in any of these

cases without which it would be presumptuous to conclude that insurance premiums would be lowered if immunity were to be fashioned for this segment of private industry. If Congress chose to fashion a government contractor defense, there would at least be an opportunity to explore that vital ingredient, among others, in an effort to prevent a windfall to the insurance industry.

Likewise, the fear that manufacturers' accountability for tortious design may possibly interfere with military decisions has absolutely no evidentiary basis in any of the cases before this Court. The *Tozer* case, for example, involves a manufacturer's decision or omission to place enough fasteners on an aircraft access panel which it designed, proposed, specified and sold to the Navy. There was no evidence or indication that holding the private manufacturer liable ever threatened to affect a military decision, command, tactic, strategy or policy in any manner. There has been no evidence known to this *amicus* that holding a manufacturer liable for tortious design has been hampering our military or has had any other adverse effect on either our defense system or the manufacturers' incentive to sell new equipment to our government or any other government.

The existence of approval of specifications which must precede the sale of these products in the procurement process should not be elevated to the status of a military decision without factual inquiry. As Judge Alarcon pointed out in his dissent in *McKay*, even the Ninth Circuit recognized that inspection and approval do not constitute direction or compulsion and that manufacturers can be responsible for their own actions and design decisions despite government ap-

proval. *McKay*, 704 F.2d at 450. The validity of his observation is confirmed by the testimony of the Justice Department before Congress in 1984 and 1985. Hearings, *supra*. The approach taken in *Shaw v. Grumman Aerospace Corp.*, 778 F.2d 736 (11th Cir. 1985), *petition for cert. pending*, (Pet. No. 85-1529), an admiralty case, at least allows for inquiry into that fact sensitive issue, and it is respectfully submitted that, if the Court were to fashion federal common law, that it be done along the lines of *Shaw* instead of summarily legislating immunity for private industry.

CONCLUSION

The decisions of the Fourth Circuit in *Tozer* and *Boyle* overruling the jury findings of negligence should be reversed.

Respectfully submitted,

MICHAEL J. PANGIA*
GILMAN, OLSON & PANGIA
Suite 600
1815 H Street, N.W.
Washington, D.C. 20006
(202) 466-5100

**Counsel of Record*

SUPPLEMENTAL BRIEF

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Respondent.

**SUPPLEMENTAL BRIEF OF AMICUS CURIAE
ASSOCIATION OF TRIAL LAWYERS OF AMERICA
IN SUPPORT OF PETITIONER**

ROBERT L. HABUSH, President
The Association of Trial Lawyers of America
777 East Wisconsin Avenue, Suite 2200
Milwaukee, Wisconsin 53202
(414) 271-0900

DALE HARALSON
Counsel of Record
Haralson, Kinerk & Morey, P.C.
82 South Stone Avenue
Tucson, Arizona 85701
(602) 792-4330

DENNEEN L. PETERSON
Miller & Pitt, P.C.
111 South Church Avenue
Tucson, Arizona 85701

*Attorneys for Amicus Curiae
The Association of Trial Lawyers of America*

QUESTION PRESENTED

When the "government contractor defense" should be available to a supplier of military equipment.

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No. 86-492

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SUMMARY OF ARGUMENT

Manufacturer responsibility for unsafe products will not adversely affect military decisions and the judiciary has the authority to protect the rights of persons who may be injured by products manufactured for the military. Civilian juries are able to make decisions about military products because, aided by expert witnesses, juries

have decided actions involving complex issues and advanced technologies.

The defense should not reward a manufacturer who knows as little as possible about its products with immunity. This is why the appropriate test is that the contractor did not participate, or participated only minimally, in the design of those products or parts of products shown to be defective; or that it timely warned the military of the risks of the design of the defective products; and notified it of alternative designs reasonably known by the contractor; and that the military, although forewarned, clearly authorized the contractor to proceed with the dangerous design. "Reasonable knowledge" means that the manufacturer is presumed to know of the defects in the things it makes.

ARGUMENT

I. MANUFACTURER RESPONSIBILITY FOR UNSAFE PRODUCTS WILL NOT ADVERSELY AFFECT MILITARY DECISIONS.

While the executive and legislative branches of the federal government are imbued in the Constitution with the primary authority to control military affairs, it does not preclude the judiciary from intervening to protect important rights of military personnel that may be threatened. Note, You're In The Army Now: Tozer v. LTV Corp. and the Government Contractor Defense, 22 Tort & Ins. L.J. 467, 480 (Spring 1987). The judiciary has been increasingly active in protecting the constitutional rights of servicemen and civilians against abuse by the military. Flower v. United States, 407 U.S. 197, 199 (1971); Hogopian v. Knowlton, 470 F.2d 201 (2d Cir. 1982). There is no reason why the judiciary should not exercise its traditional authority in the realm of products liability law to

protect servicemen from the negligence of government contractors. Id.

Any claim that civilian juries are unable to make informed judgments about military products must fail because juries, aided by expert witnesses, can and have decided actions involving complex issues and advanced technologies. Standard Oil Co. of California v. Arizona, 738 F.2d 1021, 1031-32 (9th Cir. 1984). Just because an action involves military products does not justify nullifying the traditional province of the jury.

An injured party with an otherwise meritorious claim should not be denied compensation simply because he had the misfortune to be injured by a product manufactured for the military. Westfall v. Erwin, ____ U.S. ____, 108 S.Ct. 580, 583 (1988). This Court should consider whether any claimed contribution to effective government in this context outweighs the

potential harm to individual citizens. Id. The claimed purposes of the government contractor defense do not justify extending governmental immunity to private contractors. The tort system creates the safety incentive. Indemnification of Government Contractors: Hearing on S. 1254 Before The Senate Comm. on the Judiciary, 99th Cong., 1st Sess. 26 (1985) (Statement of Richard K. Willard, United States Department of Justice). This defense removes it. Thus, in order to encourage suppliers to produce safe equipment, liability should be the rule rather than immunity.

II. IF THIS COURT CONCLUDES A DEFENSE IS NECESSARY, THE COURT SHOULD TAKE CARE TO DISTINGUISH BETWEEN THE "GOVERNMENT CONTRACT DEFENSE" AND THE "CONTRACT SPECIFICATIONS DEFENSE" AND SHOULD MAKE THE DEFENSE AVAILABLE ONLY IF THE CONTRACTOR HAS TAKEN APPROPRIATE ACTION TO PROTECT THE PRODUCT USER.

The contract specifications defense provides that a contractor is not liable for damages resulting from specifications

provided by another unless those specifications were so obviously defective and dangerous that a contractor of reasonable prudence would be put on notice that the work was dangerous and likely to cause injury. Bynum v. FMC Corp., 770 F.2d 556 (5th Cir. 1985). The contract specifications defense is distinguished from the government contractor defense because it has its source in ordinary negligence principles and applies to products manufactured to the order and specification of another, whether it be the government or a private party. On the other hand, the government contractor defense is not based on ordinary negligence principles and applies only when the product has been manufactured pursuant to a contract with the government. Johnston v. United States, 568 F.Supp. 351 (D. Kan. 1983). The contract specifications defense points out the flaws in the government contractor defense. Where

the contract specifications defense is not available when the specifications are so obviously defective and dangerous that a reasonable contractor would have declined to follow them, the government contractor defense may insulate contractors even when the specifications provided by the government are obviously dangerous. Note, Liability of a Manufacturer for Products Defectively Designed by the Government, 23 B.C.L.Rev. 1025 (1982).

The contract specifications defense comes from cases where the contractors were complying with precise specifications established by the government and where the contractors had no discretion or control over the design of the projects. Littlehale v. E.I. duPont de Nemours, 268 F.Supp. 791, 802 (S.D.N.Y. 1966). However, military contractors, unlike contractors in the early cases, cannot claim that they are merely executing the design choices of

another. A contractor merely following the specifications of another should still be held strictly liable for product design defects if the acts of the contractor meet the test suggested by Amicus Curiae ATLA.

Amicus Curiae ATLA submits that the proper test is that set forth in Shaw v. Grumman Aerospace Corporation, 778 F.2d 736 (11th Cir. 1985), cert. pending, with the knowledge test being that set forth in Borel v. Fibreboard Paper Products Corp., 493 F.2d 1076, 1089 (5th Cir. 1973), cert. denied, 419 U.S. 869, 95 S.Ct. 127, 42 L.Ed. 107 (1974). Shaw's test holds that a contractor may escape liability only if it affirmatively proves: (1) that it did not participate, or participated only minimally, in the design of those products or parts of products shown to be defective; or (2) that it timely warned the military of the risks of the design and notified it of alternative designs reasonably known by the contractor,

and that the military, although forewarned, clearly authorized the contractor to proceed with the dangerous design. Id., at 746. The Borel test regarding knowledge is that the manufacturer is held to the knowledge and skill of an expert. Id. This Court should not reward a lack of knowledge, lack of research, and lack of testing that would disclose the danger of a product with immunity. Nor should failure to implement available, but generally disregarded, devices be rewarded with immunity.

CONCLUSION

For the reasons set forth above, Amicus Curiae ATLA respectfully requests that this Court hold that the "government contractor defense" be available only if the contractor has taken the steps to protect the user of the product which comply with the suggested test set out at page 6 of the Brief of Amicus Curiae ATLA.

Respectfully Submitted,

DALE HARALSON
Counsel of Record
HARALSON, KINERK & MOREY, P.C.
82 South Stone Avenue
Tucson, Arizona 85701
(602) 792-4330

DENNEEN L. PETERSON
MILLER & PITT, P.C.
111 South Church Avenue
Tucson, Arizona 85701
(602) 792-3836

ROBERT A. HABUSH, President
The Association of Trial
Lawyers of America
777 East Wisconsin Avenue, Ste. 2200
Milwaukee, WI 53202
(414) 271-0900

Attorneys for Amicus Curiae
The Association Of Trial Lawyers of America

CERTIFICATE OF SERVICE

Dale Haralson, an attorney for Amicus Curiae and a member of the Bar of this Court, certifies that on April 13th, 1988, copies of the foregoing Supplemental Brief were served by mail upon all parties required to be served:

The Solicitor General of the United States
Department of Justice
Washington, D.C. 20530

ATTORNEYS FOR PETITIONER

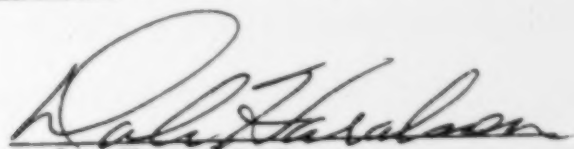
Louis S. Franecke, Esq.
John O. Mack, Esq.
MACK, HAZLEWOOD, FRANECKE & TINNEY
221 Pint Street, Suite 600
San Francisco, CA 94104
(415) 391-1560

Michael Moore, Esq.
CARTWRIGHT, SUCHERMAN & SLOBODIN, INC.
101 California Street, 26th Floor
San Francisco, CA 94111
(415) 433-0440

ATTORNEYS FOR RESPONDENT

Lewis T. Booker
Lonnie D. Nunley, III.
HUNTON & WILLIAMS
707 East Main Street
P.O. Box 1535
Richmond, Virginia 23212
(804) 788-8200

DATED THIS 13th day of April, 1988.



Dale Haralson
HARALSON, KINERK & MOREY, P.C.

Denneen L. Peterson
MILLER & PITT, P.C.

Robert L. Habush, President
The Association of Trial
Lawyers of America

SUBSCRIBED AND SWORN to before me this

13th day of April, 1988.


Notary Public

My Commission Expires:

My Commission Expires September 19, 1991
